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Tabla para la Determinación de Minerales
Radiactivos por Medio de Rayos X

por

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TABLA PARA LA DETERMINACION DE MINERALES RADIATIVOS
POR MEDIO DE RAYOS - X

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Es normal encontrar en la literatura científica, recopilaciones de datos de interés general bajo la forma de tablas que permiten a los interesados, obtener información sobre un tema específico en forma rápida y precisa.

En el caso de los minerales radiactivos existen recopilaciones muy variadas entre las que se destacan las efectuadas por Clifford Frondel (19), Geffroy, Sarcia y Chervet (20), en nuestro país por M. Butschowskyj (15), donde se detallan los espaciados de rayos-X correspondientes. La utilidad de recopilaciones tales tiene un valor grande por cuanto para el solo reconocimiento de la mayoría de los minerales radiactivos es imprescindible recurrir a su análisis por rayos-X. Ello se debe a sus similitudes físicas externas y dificultad para un estudio óptico por su hábito generalmente pulverulento.

A pesar del relativamente corto tiempo transcurrido desde la aparición de los trabajos mencionados, ellos se tornan incompletos puesto que son numerosos los datos de la índole tratada, agregados al haber científico mundial.

Por ello y como un aporte del Servicio de Laboratorios de la Gerencia de Materias Primas de la CNEA a las 2^{as}. Jornadas Geológicas Argentinas, se presenta esta recopilación que, se estima, será de utilidad para los interesados en esta rama de la ciencia (*).

En la tabla determinativa las mismas aparecen ordenadas en base a sus cuatro líneas más intensas, tabuladas en forma decreciente de d.

A continuación se dan los espaciados completos correspondientes a cada especie dispuestas por orden alfabético, citándose en cada caso la referencia bibliográfica.

* Debido a la extensión considerable de este trabajo, no pudo ser publicado en los Anales de las 2^{as}. Jornadas Geológicas Argentinas, celebradas en la ciudad de Salta en 1963.

TABLA DETERMINATIVA

Mineral	d	I	d	I	d	I	d	I	Ref.
Bayleyita	13.10	9	7.66	10	3.83	6	2.69	5	19
Andersonita	13.00	10	7.97	10	5.68	10	5.22	10	19
Rauvita	10.70	10	2.95	5	3.49	4	2.62	3	19
Zeunerita c/16H ₂ O.	10.65	10	3.59	9	5.04	8	3.39	7	19
Wyartita	10.37	MF	5.20	F	3.27	F	7.61	M	13
Autunita	10.33	10	4.96	8	3.59	7	3.49	7	19
Zeunerita c/10H ₂ O.	10.33	9	3.60	10	5.07	7	3.40	6	19
Torbernita	10.30	10	4.94	9	3.58	9	3.51	8	19
Kiunita	10.27	MF	7.96	F	3.08	F	2.87	F	9
Tyuyamunita	10.18	10	5.02	9	3.20	5	2.04	4	19
Uranospinita c/10H ₂ O.	10.16	10	3.56	9	3.39	8	5.13	7	19
Novacekita	10.15	10	3.58	9	5.06	8	3.35	5	19
Novacekita	9.92	8	3.54	10	5.00	7	3.31	6	21
Saléeita	9.85	10	3.49	9	4.85	8	2.19	7	19
Sengierita	9.82	MF	4.91	MF	3.73	F	3.19	F	19
Arsenouranocircita	9.82	8	3.68	8	1.46	8	8.64	5	24
Sabugalita	9.69	10	4.86	9	3.47	8	2.19	6	19
Haiweeita	9.26	10	4.53	8	4.41	5	3.18	4	8
Ranquilita	9.26	MF	4.47	MF	3.03	MF	8.12	F	11
Uranopilita	9.18	8	7.12	10	4.28	8	3.65	5	19
Haiweeita (granito)	9.14	10	4.55	6	4.42	6	3.19	5	8
Abernathyita	9.14	10	3.84	8	3.34	8	5.63	7	19
Heinrichita	9.11	8	3.60	10	5.07	8	3.41	7	21
Prjevalskita	9.08	9	3.61	10	1.61	6	1.58	6	15
Autunita con hidrógeno	9.03	10	3.79	9	3.27	8	3.51	7	19
Meta - zeunerita	8.93	10	3.72	9	3.30	8	3.56	7	19
Uranospinita c/8H ₂ O.	8.85	10	3.59	9	3.34	8	5.10	7	19
Meta - haiweeita	8.81	5	6.98	10	5.85	5	3.52	5	21
Swartzita	8.76	10	5.50	10	7.31	9	4.82	8	19

Mineral	d	I	d	I	d	I	d	I	Ref.
Meta-heinrichita	8.75	10	3.73	10	5.46	9	4.40	9	21
Liebigita	8.68	9	6.81	10	5.40	9	4.55	6	19
Meta-torbernita	8.66	9	3.69	10	3.24	8	3.51	7	19
Troeggerita	8.59	10	3.79	9	3.30	8	5.50	7	19
Meta-kahlerita	8.55	9	3.59	10	4.29	6	5.11	5	21
Meta-kirchheimerita	8.55	10	3.56	10	5.07	6	4.30	6	14
Meta-novacekita	8.55	10	3.56	10	2.14	8	3.01	6	21
Autunita sódica	8.54	9	3.20	10	5.36	7	2.91	7	24
Meta-tyuyamunita	8.51	MF	4.22	F	3.26	M	3.05	M	19
Meta-autunita	8.51	10	3.50	9	3.63	8	3.24	8	19
Uranospinita sódica	8.48	10	3.68	10	3.29	9	1.83	9	24
Skłodowskita	8.42	10	4.19	8	3.27	7	3.52	6	19
Francevillita	8.30	10	2.98	8	4.17	6	2.57	6	16
Bayleyita deshidratada	8.27	10	4.77	9	4.23	7	5.34	5	19
Rabbitita	8.24	10	7.79	8	4.37	8	4.71	7	19
Meta-uranocircita	8.19	7	3.58	10	2.08	7	5.37	6	19
Cuprosklodowskita	8.18	10	4.09	9	2.97	8	4.82	7	19
Dewindita	8.01	10	5.89	10	2.88	9	4.00	7	15
Andersonita	7.97	10	13.00	10	5.68	10	5.22	10	19
Renardita	7.97	10	3.99	9	5.83	8	3.13	8	19
Kiunita	7.96	F	10.27	MF	3.08	F	2.87	F	9
Uranofano con bario	7.93	8	3.99	6	2.14	5	1.99	5	24
Fosfuranilita (Portug)	7.91	10	3.96	6	3.15	6	3.10	6	19
Uranofano	7.88	10	3.94	9	2.99	8	2.91	8	19
Molibdato de U y Ca	7.85	10	3.21	8	3.89	6	8.34	5	24
Fosfuranilita (N.Carol)	7.83	10	3.97	9	5.83	8	3.12	6	19
Betauranofano	7.83	10	3.90	9	3.51	6	3.19	5	19
Rabbitita	7.79	8	8.24	10	4.37	8	4.71	7	19
Bergenita	7.78	F	3.88	F	3.07	F	2.97	M	23
Johannita	7.73	10	6.16	9	3.41	8	3.87	7	19
Arsenouranilita	7.72	10	3.85	10	8.41	8	3.13	8	5
Bayleyita	7.66	10	13.10	9	3.83	6	2.69	5	19

Mineral	d	I	d	I	d	I	d	I	Ref.
Epi-ianthinita	7.63	10	3.78	9	3.20	8	3.36	7	19
Ianthinita	7.60	MF	3.79	F	3.59	F	3.35	F	19
Billietita	7.53	10	3.77	9	3.17	8	2.03	6	19
Becquerelita	7.50	10	3.22	9	3.75	8	3.56	8	19
Schoepita	7.49	10	3.26	9	3.64	8	2.60	7	19
Zippeita - Like	7.31	10	3.66	9	3.15	8	3.51	5	19
Vandendriesscheita	7.31	10	3.19	9	3.58	8	1.99	7	10
Schroëckingerita	7.26	10	4.79	8	8.48	7	2.87	7	19
Umchoita	7.19	MF	4.80	F	14.29	M	3.60	M	19
Uranopilita	7.12	10	9.18	8	4.28	8	3.65	5	19
Gastunita	7.12	10	3.56	9	9.10	8	5.57	7	9
Weeksita	7.11	10	5.57	9	8.98	8	3.55	7	10
Masuyita	7.10	10	3.15	9	3.54	8	1.98	6	19
Zippeita - Proper	7.06	10	3.12	9	3.51	8	2.86	6	19
Meta-haiweeita	6.98	10	8.81	5	5.85	5	3.52	5	21
Liebigita	6.81	10	8.68	9	5.40	9	4.55	6	19
Boltwoodita	6.81	10	3.39	8	2.94	8	3.53	7	25
Carnotita	6.56	10	3.12	7	3.53	5	4.25	3	19
Curita	6.28	10	3.97	9	3.14	8	2.55	6	19
Iriginita	6.19	10	3.20	9	1.62	9	2.14	8	10
Johannita	6.16	9	7.73	10	3.41	8	3.87	7	19
Pandaita	6.09	80	3.04	100	1.86	70	1.59	70	22
Dewindita	5.89	10	8.01	10	2.88	9	4.00	7	15
Weeksita	5.57	9	7.11	10	8.98	8	3.55	7	10
Mineral E	5.53	8	4.95	10	1.88	7	3.01	4	21
Swartzita	5.50	10	8.76	10	7.31	9	4.82	8	19
Vandenbrandeita	5.26	9	4.44	10	2.97	8	2.59	7	19
Wyartita	5.20	F	10.37	MF	3.27	F	7.61	M	13
Tyuyamunita	5.02	9	10.18	10	3.20	5	2.04	4	19
Ursilita magnésica	4.98	10	3.06	10	2.30	9	2.07	9	6
Autunita	4.96	8	10.33	10	3.59	7	3.49	7	19
Mineral E	4.95	10	5.53	8	1.88	7	3.01	4	21
Torbernita	4.94	9	10.30	10	3.58	9	3.51	8	19

Mineral	d	I	d	I	d	I	d	I	Ref.
Senglerita	4.91	MF	9.82	MF	3.73	F	3.19	F	19
Bassetita	4.89	10	3.46	10	8.59	6	2.20	6	19
Sabugalita	4.86	9	9.69	10	3.47	8	2.19	6	19
Umohoita	4.80	F	7.19	MF	14.29	M	3.60	M	19
Schroëckingerita	4.79	8	7.26	10	8.48	7	2.87	7	19
Bayleyita deshidratada	4.77	9	8.27	10	4.23	7	5.34	5	19
Thorogummita	4.69	9	3.53	10	2.65	6	1.81	6	19
Coffinita	4.66	F	3.47	F	2.64	M	1.80	M	19
Rutherfordina	4.60	10	3.21	9	4.29	8	3.90	6	19
Haiweeita (granito)	4.55	6	9.14	10	4.42	6	3.19	5	8
Haiweeita (amb.lacunar)	4.53	8	9.26	10	4.41	5	3.18	4	8
Soddyita	4.48	9	3.32	10	6.14	8	2.69	7	19
Ranquilita	4.47	MF	9.26	MF	3.03	MF	8.12	F	11
Vandenbrandeita (Harvard)	4.44	10	5.26	9	2.97	8	2.59	7	19
Zircón	4.43	45	3.30	100	2.51	45	1.71	40	12
Dumontita	4.29	10	3.02	10	3.75	9	3.49	6	19
Vandenbrandeita	4.29	10	2.92	8	5.06	4	2.56	4	19
Parsonsita	4.25	10	3.28	8	2.13	6	1.66	6	19
Meta-tyuyamunita	4.22	F	8.51	MF	3.26	M	3.05	M	19
Skłodowskita	4.19	8	8.42	10	3.27	7	3.52	6	19
Cuproskłodowskita	4.09	9	8.18	10	2.97	8	4.82	7	19
Renardita	3.99	9	7.97	10	5.83	8	3.13	8	19
Uranofano con bario	3.99	6	7.93	8	2.14	5	1.99	5	24
Fosfuranilita (N.Carolin)	3.97	9	7.83	10	5.83	8	3.12	6	19
Curita	3.97	9	6.28	10	3.14	8	2.55	6	19
Fosfuranilita	3.96	6	7.91	10	3.15	6	3.10	6	19
Uranofano	3.94	9	7.88	10	2.99	8	2.91	8	19
Betauranofano	3.90	9	7.83	10	3.51	6	3.19	5	19
Bergenita	3.88	F	7.78	F	3.07	F	2.97	M	23
Arsenouranilita	3.85	10	7.72	10	8.41	8	3.13	8	5
Abernathyita	3.84	8	9.14	10	3.34	8	5.63	7	19
Autunita c/hidrógeno	3.79	9	9.03	10	3.27	8	3.51	7	19
Troeggerita	3.79	9	8.59	10	3.30	8	5.50	7	19

Mineral	d	I	d	I	d	I	d	I	Ref.
Ianthinita	3.79	F	7.60	MF	3.59	F	3.35	F	19
Epi-ianthinita	3.78	9	7.63	10	3.20	8	3.36	7	19
Uramphita	3.78	10	2.22	9	1.69	9	2.75	8	6
Billietita	3.77	9	7.53	10	3.17	8	2.03	6	19
Fersmita	3.76	21	3.04	100	1.52	15	2.49	14	5
Meta-heinrichita	3.73	10	8.75	10	5.46	9	4.40	9	21
Meta-zeunerita	3.72	9	8.93	10	3.30	8	3.56	7	19
Meta-torbernita	3.69	10	8.66	9	3.24	8	3.51	7	19
Arsenouranocircita	3.68	8	9.82	8	1.46	8	8.64	5	24
Uranospinita sódica	3.68	10	8.48	10	3.29	9	1.83	9	24
Autunita sódica	3.67	10	2.67	8	1.55	8	3.23	7	24
Zippeita - Like	3.66	9	7.31	10	3.15	8	3.51	5	19
Manganomosita calent.	3.66	6	2.97	10	1.72	6	1.77	5	5
Prjevalskita	3.61	10	9.08	9	1.61	6	1.53	6	15
Vandendriesscheita	3.61	9	3.22	10	7.41	8	2.55	4	19
Zeunerita c/10H ₂ O.	3.60	10	10.33	9	5.07	7	3.40	6	19
Heinrichita	3.60	10	9.11	8	5.07	8	3.41	7	21
Zeunerita c/16H ₂ O.	3.59	9	10.65	10	5.04	8	3.39	7	19
Uranospinita c/8H ₂ O.	3.59	9	8.85	10	3.34	8	5.10	7	19
Meta-kahlerita	3.59	10	8.55	9	4.29	6	5.11	5	21
Novacekita	3.58	9	10.15	10	5.06	8	3.35	5	19
Meta-uranocircita	3.58	10	8.19	7	2.08	7	5.37	6	19
Uranospinita c/10H ₂ O.	3.56	9	10.16	10	3.39	8	5.13	7	19
Meta-kirchheimerita	3.56	10	8.55	10	5.07	6	4.30	6	14
Meta-novacekita	3.56	10	8.55	10	2.14	8	3.01	6	21
Gastunita	3.56	9	7.12	10	9.10	8	5.57	7	9
Thorita	3.56	10	1.84	10	4.69	9	2.66	8	19
Novacekita	3.54	10	9.92	8	5.00	7	3.31	6	21
Thorogummita	3.53	10	4.69	9	2.65	6	1.81	6	19
Allanita(metamíctica)	3.52	50	2.93	100	2.69	30	2.62	10	15
Mineral D	3.51	10	2.96	10	8.55	8	4.83	4	21
Meta-autunita	3.50	9	8.51	10	3.63	8	3.24	8	19
Saléeita	3.49	9	9.85	10	4.95	8	2.19	7	19

Mineral	d	I	d	I	d	I	d	I	Ref.
Coffinita	3.47	F	4.66	F	2.64	M	1.80	M	19
Wölsendorfit	3.47	MF	3.09	MF	6.93	F	3.13	F	17
Bassetita	3.46	10	4.89	10	8.59	6	2.20	6	19
Fourmarierita	3.45	9	3.09	10	1.90	8	1.72	7	19
Brannerita	3.42	10	1.90	8	2.45	7	2.27	7	19
Davidita	3.40	9	2.87	10	1.70	9	3.23	8	19
Boltwoodita	3.39	8	6.81	10	2.94	8	3.53	7	25
Ursilita	3.37	10	3.02	10	4.56	9	1.82	9	6
Clarkeita	3.34	9	3.17	10	5.77	8	1.96	7	19
Soddyita	3.32	10	4.48	9	6.14	8	2.69	7	19
Monacita (Suiza)	3.32	F	1.36	MF	1.86	F	1.65	F	15
Monacita (Corea)	3.31	7	3.09	10	2.88	7	4.17	6	15
Zircón	3.30	100	4.43	45	2.51	45	1.71	40	12
Huttonita	3.29	10	3.10	8	1.60	6	1.85	5	1
Parsonsita	3.28	8	4.25	10	2.13	6	1.66	6	19
Schoepita	3.26	9	7.49	10	3.64	8	2.60	7	19
Cheralita	3.26	F	3.07	MF	2.86	F	4.14	M	19
Kasolita	3.26	10	2.93	9	4.19	8	3.53	7	19
Walpurgita	3.25	5	3.11	10	3.05	5	9.90	4	19
Becquerelita	3.22	9	7.50	10	3.75	8	3.56	8	19
Vandendriesscheita	3.22	10	3.61	9	7.41	8	2.55	4	19
Orlita	3.22	10	1.67	7	6.35	5	1.96	5	15
Iriginita	3.22	10	1.12	8	2.62	6	2.14	6	4
Molibdato de uranio y calcio	3.21	8	7.85	10	3.89	6	8.34	5	24
Rutherfordina	3.21	9	4.60	10	4.29	8	3.90	6	19
Thorianita	3.21	10	1.68	9	1.97	8	2.78	4	19
Autunita sódica	3.20	10	8.54	9	5.36	7	2.91	7	24
Iriginita	3.20	9	6.19	10	1.62	9	2.14	8	10
Chevkinita	3.20	F	2.74	F	4.97	M	4.71	M	5
Chevkinita	3.20	F	2.74	MF	4.67	M	3.11	M	5
Samiresita	3.20	10	2.50	8	4.05	6	1.83	5	19
Vandendriesscheita	3.19	9	7.31	10	3.58	8	1.99	7	10

Mineral	d	I	d	I	d	I	d	I	Ref.
Clarkeita	3.17	10	3.34	9	5.77	8	1.96	7	19
Uranospherita	3.16	10	1.83	8	3.87	7	5.25	6	19
Masuyita	3.15	9	7.10	10	3.54	8	1.98	6	19
Uraninita	3.14	10	1.64	9	1.92	8	1.05	7	19
Zippeita - Proper	3.12	9	7.06	10	3.51	8	2.86	6	19
Carnotita	3.12	7	6.56	10	3.53	5	4.25	3	19
Delorenzita	3.12	10	2.87	7	2.67	3	2.52	3	19
Cerianita	3.12	100	1.91	51	1.63	44	2.70	29	19
Walpurgita	3.11	10	3.25	5	3.05	5	9.90	4	19
Carnasurtita	3.10	7	2.88	7	3.29	6	3.49	5	11
Huttonita	3.10	8	3.29	10	1.60	6	1.85	5	1
Wölsendorfit	3.09	MF	3.47	MF	6.93	F	3.13	F	17
Fourmarierita	3.09	10	3.45	9	1.90	8	1.72	7	19
Monacita (Corea)	3.09	10	3.31	7	2.88	7	4.17	6	15
Huttonita	3.09	8	2.89	7	4.23	6	3.29	6	19
Cheralita	3.07	MF	3.26	F	2.86	F	4.14	M	19
Ursilita magnésica	3.06	10	6.98	10	2.30	9	2.07	9	6
Fergusnita-Formanita	3.05	MF	1.89	MF	2.71	F	2.59	F	15
Pandaita	3.04	100	6.09	80	1.86	70	1.59	70	22
Fersmita	3.04	100	3.76	21	1.52	15	2.49	14	14
Ranquilita	3.03	MF	9.26	MF	4.47	MF	8.12	F	11
Dumontita	3.02	10	4.29	10	3.75	9	3.49	6	19
Ursilita	3.02	10	3.37	10	4.56	9	1.82	9	6
Ningoyita	3.02	MF	2.81	F	2.13	F	4.33	M	7
Francevillita	2.98	8	8.30	10	4.17	6	2.56	6	16
Manganomossita	2.98	5	3.66	3	1.72	2	1.46	2	5
Microлита	2.98	10	1.83	8	1.56	8	5.98	6	19
Euxenita - Polycrasa	2.98	10	1.82	4	1.72	4	1.48	4	15
Betafita	2.98	10	1.82	8	1.55	6	3.99	3	19
Yttrotantalita - Yttrocolumbита	2.98	100	1.56	100	1.19	100	1.16	100	12-15
Manganomossita (calent)	2.97	10	3.66	6	1.72	6	1.77	5	5
Mineral D	2.96	10	3.51	10	8.55	8	4.83	4	21

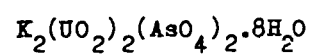
Mineral	d	I	d	I	d	I	d	I	Ref.
Rauvita	2.95	5	10.70	10	3.49	4	2.62	3	19
Columbita-Tantalita	2.95	F	1.72	F	1.45	F	3.63	M	15
Uvanita	2.94	10	1.71	9	2.24	8	1.48	7	19
Sinicita	2.94	10	1.63	8	1.58	6	3.04	4	6
Allanita(metamictica)	2.93	100	3.52	50	2.69	30	2.62	10	15
Kasolita	2.93	9	3.26	10	4.19	8	3.53	7	19
Vandenbrandeita	2.92	8	4.29	10	5.06	4	2.56	4	19
Allanita	2.92	9	2.91	10	2.86	5	3.52	4	15
Allanita	2.91	10	2.92	9	2.86	5	3.52	4	15
Zirconolita	2.91	10	1.98	9	1.79	9	2.50	4	18
Nenadkevita	2.90	10	1.88	6	4.65	4	3.50	4	24
Huttonita	2.89	7	3.09	8	4.23	6	3.29	6	19
Carnasurtita	2.88	7	3.10	7	3.29	6	3.49	5	11
Davidita	2.87	10	3.40	9	1.70	9	3.23	8	19
Delorenzita	2.87	7	3.12	10	2.67	3	2.52	3	19
Davidita	2.86	10	1.60	9	1.44	9	1.81	8	19
Ningoyita	2.81	F	3.02	MF	2.13	F	4.33	M	7
Chevkinita	2.74	F	3.20	F	4.97	M	4.71	M	5
Chevkinita	2.74	MF	3.20	F	4.67	M	3.11	M	5
Autunita sódica	2.67	8	3.67	10	1.55	8	3.23	7	24
Samiresita	2.50	8	3.20	10	4.05	6	1.83	5	19
Uramphita	2.22	9	3.78	10	1.69	9	2.75	8	6
Gagarinita	2.08	9	1.71	10	3.00	5	2.92	5	14
Lodochnikita	2.01	7	1.97	7	1.65	7	2.41	6	15
Zirconolita	1.98	9	2.91	10	1.79	9	2.50	4	18
Lodochnikita	1.97	7	2.01	7	1.65	7	2.41	6	15
Cerianita	1.91	51	3.12	100	1.63	44	2.70	29	19
Brannerita	1.90	8	3.42	10	2.45	7	2.27	7	19
Fergusonita-Formanita	1.89	MF	3.05	MF	2.71	F	2.59	F	15
Nenadkevita	1.88	6	2.90	10	4.65	4	3.50	4	24
Thorita	1.84	10	3.56	10	4.69	9	2.66	8	19
Ursilita	1.83	9	3.37	10	3.02	10	4.56	9	5
Uranospherita	1.83	8	3.16	10	3.87	7	5.25	6	19

Mineral	d	I	d	I	d	I	d	I	Ref.
Microcita	1.83	8	2.98	10	1.56	8	5.98	6	19
Euxenita-Polycrasa	1.82	4	2.98	10	1.72	4	1.48	4	15
Betafita	1.82	8	2.98	10	1.55	6	3.99	3	19
Xenotima	1.75	10	1.42	9	3.34	8	1.70	8	15
Columbita-Tantalita	1.72	F	2.95	F	1.45	F	3.63	M	15
Uvanita	1.71	9	2.94	10	2.24	8	1.48	7	19
Gagarinita	1.71	10	2.08	9	3.00	5	2.92	5	14
Thorianita	1.68	9	3.21	10	1.97	8	2.78	4	19
Orlita	1.67	7	3.22	10	6.35	5	1.96	5	15
Uraninita	1.64	9	3.14	10	1.92	8	1.05	7	19
Sinicitita	1.63	8	2.94	10	1.58	6	3.04	4	6
Ufertita	1.61	9	1.45	10	2.89	7	2.77	6	15
Davidita	1.60	9	2.86	10	1.44	9	1.81	8	19
Yttrotantalita - Yttrocolumbita	1.56	100	2.98	100	1.19	100	1.16	100	12y15
Samarskita	1.56	100	1.19	100	2.94	90	2.84	90	15
Ufertita	1.45	10	1.61	9	2.89	7	2.77	6	15
Xenotima	1.42	9	1.75	10	3.34	8	1.70	8	15
Monacita (Sulza)	1.36	MF	3.32	F	1.86	F	1.65	F	15
Samarskita	1.19	100	1.56	100	2.94	90	2.84	90	15
Iriginita	1.12	8	3.22	10	2.62	6	2.14	6	4

MINERALS

ABERNATHYITA

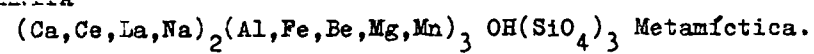
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,14	10b	2,79	6b	2,07	6	1,667	3	1,359	1
5,63	7	2,61	5b	1,948	3	1,625	3	1,300	1
5,11	4	2,54	3	1,919	1	1,606	6	1,280	5
4,58	4	2,45	5	1,879	3	1,582	3	1,261	4
4,43	4	2,32	3	1,855	1	1,514	3	1,240	1b
3,84	8b	2,28	6	1,822	5	1,482	3	1,212	1b
3,59	7	2,21	6	1,797	3	1,458	3	1,206	3
3,34	8	2,17	2	1,780	3	1,421	6	1,198	3
3,16	1	2,12	6	1,712	6	1,372	3	1,187	1
3,02	5								

ALLANITA

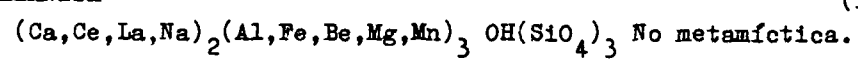
(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,52	50b	2,93	100b	2,69	30b	2,62	10b		

ALLANITA

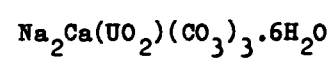
(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,20	20	3,78	10	2,86	50	2,20	10	1,89	20
8,05	20	3,59	10	2,82	10	2,18	20	1,78	2
7,96	20	3,52	40	2,68	40	2,15	10	1,67	10
5,09	10	3,30	10	2,62	40	2,14	10	1,65	10
5,01	10	3,23	20	2,51	20	2,10	2	1,64	20
4,87	5	2,92	90	2,50	10	2,05	2	1,56	20
4,69	20	2,91	100	2,33	10	1,91	2	1,12	2

ANDERSONITA

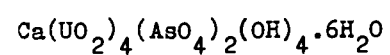
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
13,0	10	4,04	4	2,45	5	1,933	4	1,262	3
9,51	3	3,82	3	2,39	5	1,895	4	1,232	3
7,97	10	3,71	8	2,36	4	1,852	6	1,038	2
6,56	2	3,49	2	2,21	7	1,749	5	0,980	2
5,68	10	3,34	2	2,04	4	1,684	3	0,951	2
5,22	10	3,15	5	2,01	4	1,573	4	0,819	2
4,35	6	3,00	7	1,977	4	1,393	3	0,801	2
4,19	6	2,79	6	1,957	4	1,344	3		

ARSENOURANILITA

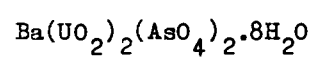
(5)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,41	8	3,42	7	2,57	6	1,778	7	1,612	7
7,72	10	3,13	8	1,883	6	1,729	7	1,512	7
3,85	10								

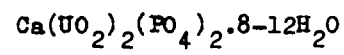
ARSENOURANOCIRCITA

(24)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,82	8	2,87	1	1,935	4	1,461	8	1,240	1
8,64	5	2,61	1	1,818	1	1,428	2	1,208	2
4,83	3	2,44	1	1,756	1	1,400	1	1,178	2
4,60	1	2,36	2	1,743	2	1,368	2	1,126	4
4,04	5	2,31	1	1,695	2	1,321	1	1,116	1
3,68	8	2,20	5	1,656	5	1,287	2	1,092	1
3,54	1	2,14	3	1,622	2	1,262	3	1,076	1
3,46	1	2,10	3	1,569	3	1,248	1	1,058	1
3,21	2	2,02	2	1,540	1				

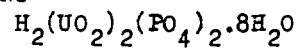
AUTUNITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,33	10	2,71	2	1,720	1	1,288	1	1,027	1
8,97	1	2,49	2	1,644	1	1,261	2	0,985	3
6,70	2	2,40	2	1,617	4	1,223	2d	0,971	1
4,96	8	2,21	3	1,566	2	1,191	3	0,966	1
4,48	6	2,15	3	1,539	2	1,159	1	0,949	1
3,59	7	2,03	2	1,506	2	1,133	1	0,935	1
3,49	7	1,911	1d	1,473	1	1,101	1	0,930	1
3,33	7	1,871	1d	1,412	1	1,072	2	0,916	2
3,12	1	1,823	1d	1,357	4	1,036	1	0,905	1
2,88	5	1,750	2	1,323	2				

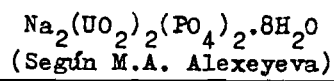
AUTUNITA CON HIDROGENO



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,032	10	2,964	6	2,075	4	1,61		1,359	1
5,556	5	2,765	7	1,902	2	1,57	3b	1,338	0,5
4,971	4	2,576	3	1,844	3	1,546	1	1,288	0,5
4,542	0,5	2,488	3	1,789	3	1,477	1	1,270	1
4,360	3	2,397	4	1,755	2	1,439	1	1,249	2
3,799	9	2,267	2	1,722	2	1,401	2	1,221	0,5
3,511	7	2,216	3	1,697	3	1,383	1	1,194	3
3,270	8	2,163	5	1,633	3				

AUTUNITA SODICA

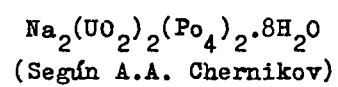


(24)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,54	9	3,20	10	2,05	5	1,607	3	1,180	1
5,36	7	2,91	7	1,988	2	1,540	3	1,153	3
4,81	4	2,65	3	1,877	2	1,363	4	1,087	3
4,23	4	2,44	4	1,7755	2	1,322	2	1,076	2
3,997	3	2,36	5	1,669	5	1,301	2	1,058	2
3,64	5	2,20	5	1,663	5	1,251	1	1,043	1
3,445	6	2,12	6						

AUTUNITA SODICA

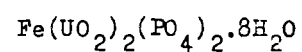
(24)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,57	5	2,54	4	1,889	2	1,576	2	1,322	4
5,40	4	2,46	3	1,845	3	1,556		1,298	3
4,32	5	2,36	4	1,816	4	1,540	8	1,282	1
4,03	2	2,20	3	1,768	3	1,461	3	1,259	2
3,67	10	2,16	3	1,476	3	1,449	3	1,240	2
3,49	5	2,12	6	1,711	3	1,420	4	1,214	
3,23	7	2,05	5	1,639	7	1,386	2	1,200	2
2,94	5	1,984	5	1,614	4	1,364	7	1,187	
2,675	8								

BASSETITA

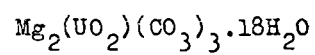
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,59	6	3,10	1	2,26	0,5	1,783	0,5	1,374	0,5d
4,89	10	2,96	3	2,20	6	1,741	2	1,316	0,5d
4,66	0,5	2,85	2	2,13	1	1,708	0,5d	1,191	1d
4,24	3	2,72	0,5	2,07	0,5	1,627	1d	1,162	1d
4,05	3	2,55	0,5d	1,921	0,5d	1,557	1d	1,128	0,5d
3,46	10	2,46	2d	1,830	2	1,429	0,5d	1,106	0,5d
3,32	0,5	2,34	0,5						

BAYLEYITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
13,1	9	4,71	1	3,15	2	2,37	2	1,796	2b
7,66	10	4,54	2	3,05	2	2,30	2	1,754	2b
6,53	4	4,41	2	2,96	2	2,21	5	1,682	1
5,85	4b	3,83	6	2,88	4	2,12	4	1,378	1
5,08	4	3,70	2	2,69	5	1,908	3b	1,247	1
4,89	4	3,26	4	2,42	2				

BAYLEYITA

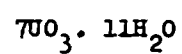
(19)

Producto de deshidratación.

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,27	10	4,42	3	3,02	3	2,32	4	1,848	3
7,25	2	4,23	7	2,89	2	2,26	3	1,811	2
6,24	1	4,00	3	2,86	2	2,14	3	1,787	3
5,54	1	3,75	2	2,76	3	2,12	3	1,752	2
5,34	5	3,56	2	2,71	3	2,08	2	1,695	3
5,13	3	3,49	3	2,64	4	2,05	3	1,578	3
4,77	9	3,20	3	2,47	2	1,973	2	1,551	2
4,62	2	3,11	4	2,44	3	1,881	4	1,352	2b
4,51	3	3,07	3						

BECQUERELITA

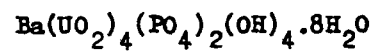
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,51	1	2,88	3	1,893	2	1,378	3	1,054	1
7,50	10	2,73	1	1,875	2	1,332	1	1,029	1
6,63	2	2,58	7	1,848	2	1,289	1	0,987	1
6,24	1	2,47	2	1,814	1	1,271	1	0,967	1
5,63	1	2,44	2	1,773	3	1,240	1	0,955	1
4,71	6	2,38	2	1,725	3	1,224	1	0,944	1
4,31	1	2,31	3	1,681	2	1,207	1	0,933	1
3,75	8	2,21	1	1,614	2	1,188	1	0,914	1
3,56	8	2,11	2	1,600	2	1,169	1	0,887	1
3,48	2	2,07	3	1,564	2	1,152	1	0,859	1
3,39	2	2,04	4	1,541	1	1,134	1	0,842	1
3,22	9	1,944	4	1,451	2	1,121	1	0,836	1
3,13	1	1,943	5	1,411	3	1,108	1	0,834	1
2,97	2								

BERGENITA

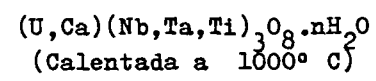
(23)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,78	F	3,762	d	2,436	d	2,021	d	1,823	d
6,41	d	3,437	M	2,384	d	1,999	md	1,741	d
5,80	d	3,361	d	2,308	md	1,904	M	1,721	d
5,43	d	3,203	M	2,149	md	1,883	d	1,677	d
4,41	d	3,076	F	2,074	M	1,872	d	1,652	md
3,883	F	2,976	F-M						

BETAPITA

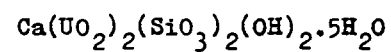
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,99	3	2,57	2	1,70	2	1,485	1	1,154	3
3,55	1	2,49	3	1,63	1	1,355	1	1,050	1
3,28	1	2,20	1	1,59	1	1,290	1	1,025	1
3,19	2	2,00	1	1,55	6	1,181	2	0,990	2
2,98	10	1,82	8						

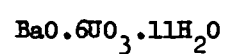
BETA-URANOFANO

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,83	10	3,19	5	2,20	2b	1,807	3	1,461	1
6,66	4	3,04	4	2,17	1	1,778	2	1,441	1
6,15	4	2,99	3	2,13	1	1,734	3	1,417	1
5,07	4	2,91	2	2,11	1	1,701	2b	1,388	1b
4,85	4	2,83	4	2,08	2	1,658	1b	1,358	2b
4,55	4	2,78	3	2,04	1b	1,623	3b	1,310	1b
4,11	3	2,59	5	2,01	1	1,590	0,5	1,293	1b
3,90	9	2,41	2b	1,98	3b	1,551	1	1,274	2
3,75	1	2,36	2b	1,93	3b	1,528	1	1,264	2
3,51	6	2,29	1	1,877	3	1,506	1	1,186	1b
3,41	1	2,21	2b	1,841	3	1,484	1	1,161	2b
3,35	2								

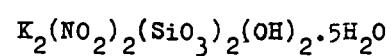
BILLIETITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,53	10	2,03	6	1,459	2	1,097	1	0,898	1
4,59	2	1,970	4	1,429	1	1,073	2	0,884	2
3,77	9	1,940	2	1,381	2	1,058	1	0,871	2
3,54	5b	1,898	1	1,357	1	1,042	1	0,858	1
3,17	8	1,872	3	1,310	2	1,026	1	0,852	1
3,02	1	1,812	1	1,281	2	1,013	1	0,843	2
2,89	1	1,790	2	1,251	1d	1,003	1	0,831	2
2,79	2	1,676	3	1,226	1	0,987	1	0,824	1
2,56	3	1,654	4	1,212	1d	0,981	1	0,783	4
2,49	4	1,604	1	1,189	1d	0,944	3	0,783	2
2,30	2	1,568	2	1,163	1	0,931	1	0,776	2
2,19	1d	1,530	1d	1,140	2	0,914	1	0,774	1
2,10	3	1,501	2	1,123	1				

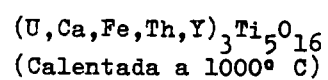
BOLTWOODITA



(25)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,81	10	4,72	4	4,08	1	3,39	8	2,94	8
6,42	4	4,29	3	3,53	7	3,12	5	2,89	6

BRANNERITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,07	3	2,511	4	1,903	8	1,569	5	1,371	4d
4,70	5	2,455	7	1,861	6	1,557	3	1,308	3
4,31	2	2,426	2	1,776	1	1,489	1	1,289	1d
3,42	10	2,276	7	1,729	3	1,481	2	1,268	2
3,32	6	2,151	2	1,700	4	1,461	2	1,255	3
3,02	3	2,080	1	1,623	6	1,440	2	1,242	1
2,91	5	2,029	4	1,609	4	1,411	1	1,230	3
2,76	4	2,017	2	1,585	2				

CARNOTITA $K_2(UO_2)_2(VO_4)_2 \cdot 1-3H_2O$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,56	10	3,25	3	2,475	1	1,914	1	1,613	1
5,12	1	3,12	7	2,156	3	1,831	1	1,531	1
4,53	0,5	2,715	1	2,032	1	1,784	1	1,508	1
4,25	3	2,594	0,5	1,998	1	1,678	1	1,455	1
3,53	5	2,571	2	1,942	2	1,655	1		

CERIANITA $(CeO_2)(ThO_2)(UO_2)(Y_2O_3, In_2O_3, ZrO_2)$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,124	100	1,562	5	1,210	6	0,9565	5	0,8556	7
2,706	29	1,353	5	1,1044	12	0,9146	13	0,8251	6
1,913	51	1,241	15	1,0412	9	0,9018	7	0,8158	5
1,632	44								

CHEMALITA $(Th, Ca, Ce, La, U, Pb)(PO_4, SiO_4)$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,20	md	3,26	F	2,60	md	1,958	d	1,733	d
4,68	d	3,07	MF	2,44	md	1,870	db	1,684	d
4,14	M-F	2,96	md	2,18	d	1,795	md	1,534	md
3,49	d	2,86	F	2,13	db	1,758	md		

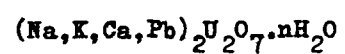
CHEVKINITA $(Ce, La, Y, Ca, Th, Na)_2O_3 \cdot 2(Ti, Fe^{IV}, Mg)O_2 \cdot 2(Si, Al, Fe^{III})O_2$ (5)
(New Hampshire)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,50	d	3,67	d	3,11	M	2,79	d	2,19	d
4,92	d	3,51	d	2,98	d	2,74	MF	1,99	d
4,67	M	3,20	Fb	2,90	M	2,60	d		

CHEVKINITA $(Ce, La, Y, Ca, Th, Na)_2O_3 \cdot 2(Ti, Fe^{IV}, Mg)O_2 \cdot 2(Si, Al, Fe^{III})O_2$ (5)
(Arizona)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,97	M	3,52	M	3,04	M	2,74	F	2,19	d
4,71	M	3,20	F	2,91	M	2,38	d	1,98	M
3,68	d	3,11	d	2,77	d				

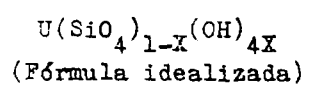
CLARKEITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,98	1	2,69	5	1,697	2	1,351	2	1,064	2
8,33	1	2,61	4	1,676	3	1,278	4	1,044	2
6,70	2	2,45	3	1,636	5	1,239	2	0,989	2
5,77	8	2,06	2	1,589	2	1,227	1	0,975	1
4,09	4	2,03	1	1,564	2	1,182	1b	0,947	1
3,34	9	1,968	7	1,537	1	1,152	1	0,937	1
3,17	10	1,863	6	1,416	1	1,140	1	0,929	1
2,92	3	1,764	5	1,389	1	1,118	2	0,917	1

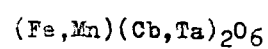
COFFINITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,66	F	2,64	M	2,01	md	1,737	d	1,451	md
3,47	F	2,46	md	1,841	d	1,629	md	1,435	md
2,78	d	2,18	d	1,801	M	1,556	md		

COLUMBITA-TANTALITA

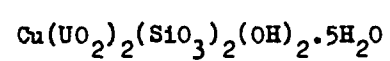


(15)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,63	M	1,94	dd	1,378	M	1,077	M	0,924	M
3,26	M	1,89	d	1,311	d	1,046	d	0,903	d
2,95	F	1,83	d	1,244	d	1,035	d	0,882	d
2,84	d	1,77	M	1,221	d	1,022	d	0,871	dd
2,53	d	1,72	F	1,193	d	1,009	dd	0,839	M
2,48	M	1,60	d	1,136	d	0,996	M	0,824	d
2,36	M	1,54	M	1,123	d	0,980	d	0,809	d
2,20	d	1,485	d	1,103	d	0,956	dd	0,799	d
2,08	M	1,459	F	1,088	M	0,932	d		

CUPROSKŁODOWSKITA

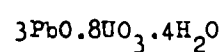
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,18	10	3,10	1	2,17	3	1,736	2	1,436	2
6,10	6	2,97	8	2,12	2	1,703	1	1,397	1
4,82	7	2,87	1	2,07	2	1,643	3	1,362	1b
4,29	2	2,72	5	2,04	4	1,614	1	1,332	1
4,09	9	2,64	5	1,906	5b	1,587	1	1,301	2b
3,52	6	2,36	1	1,860	4b	1,564	1	1,279	2
3,30	2	2,29	2	1,805	3	1,503	1	1,227	1
3,20	2	2,21	6	1,766	3	1,472	2		

CURITA

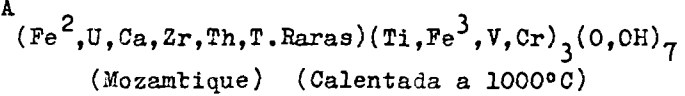
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,28	10	2,93	2	2,17	1	1,87	1	1,57	2
4,17	1	2,81	1	2,10	5	1,84	2	1,54	1
3,97	9	2,70	4	2,04	1	1,80	3	1,51	1
3,53	4	2,55	6	2,00	1	1,74	5	1,49	1
3,36	4	2,47	3	1,95	1	1,70	2	1,47	1
3,14	8	2,35	1	1,91	1	1,66	2	1,43	1
3,07	4	2,24	1	1,90	1	1,62	2	1,40	3

DAVIDITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,71	2	2,87	10	2,03	1	1,60	5	1,07	2
5,16	-	2,62	3	1,96	2	1,57	1	0,90	3
4,47	2	2,48	8	1,91	4	1,55	1	0,89	2
4,15	6	2,42	3	1,84	2	1,51	3	0,86	3
3,40	9	2,25	8	1,80	6	1,44	7	0,83	3
3,23	8	2,19	3	1,78	1	1,38	4	0,82	1
3,05	8	2,10	2	1,70	9	1,12	1		

DAVIDITA (19)
 $(\text{Fe}^{2+}, \text{U}, \text{Ca}, \text{Zr}, \text{Th}, \text{T. Raras})(\text{Ti}, \text{Fe}^{3+}, \text{V}, \text{Cr})_3(\text{O}, \text{OH})_7$
 (South Australia) (Calentada a 1000°C)

d Å	I	d Å	I	d Å	I	d Å	I	d Å	I
3,42	6	2,49	7	2,09	1	1,81	8	1,60	9
3,25	6	2,44	3	2,04	4	1,78	2	1,58	2
3,08	3	2,26	7	1,97	1	1,71	8	1,55	2
2,86	10	2,20	4	1,92	2	1,69	8	1,51	1
2,65	2	2,15	1	1,85	2	1,65	1	1,44	9

DELORENZITA (19)
 $(\text{U}, \text{Fe}, \text{V})(\text{Ti}, \text{Sn})_3\text{O}_8$

d Å	I	d Å	I	d Å	I	d Å	I	d Å	I
3,12	10	2,67	3	2,52	3	2,28	1	2,15	1
2,87	7								

DEWINDITA (15)
 $\text{Pb}_3(\text{UO}_2)_5(\text{PO}_4)_4(\text{OH})_4 \cdot 10\text{H}_2\text{O}$

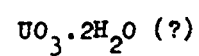
d Å	I	d Å	I	d Å	I	d Å	I	d Å	I
8,01	10	4,77	2	3,90	1	3,14	7	2,96	5
5,89	10	4,37	4	3,86	1	3,07	5	2,88	9
4,99	2	4,00	7	3,40	5				

DUMONTITA (19)
 $\text{Pb}_2(\text{UO}_2)_3(\text{PO}_4)_2(\text{OH})_4 \cdot 3\text{H}_2\text{O}$

d Å	I	d Å	I	d Å	I	d Å	I	d Å	I
7,69	4	3,79	1	2,96	5	2,15	3	1,85	1
6,97	4	3,75	9	2,87	5	2,11	2	1,77	1
6,11	4	3,49	6	2,69	2	2,04	2	1,74	1
5,68	4	3,35	2	2,58	1	1,95	1	1,65	1
4,29	10	3,02	10	2,48	1	1,93	2	1,52	1

EPI-IANTHINITA

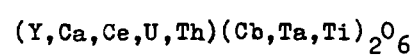
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,63	10b	2,06	2	1,574	5	1,127	3	0,882	1
5,37	2	2,03	3	1,541	1	1,115	2	0,874	1
4,13	4	1,978	2	1,510	1	1,102	1	0,871	2
3,78	9	1,950	2	1,470	1d	1,086	3	0,865	2
3,60	3	1,915	2	1,436	3d	1,067	2b	0,855	3
3,36	7	1,889	4	1,405	1d	1,027	4b	0,847	2
3,20	8b	1,833	2	1,380	1	1,009	1d	0,831	1
2,96	6	1,783	3	1,343	2	0,985	2	0,825	1
2,67	5	1,756	1	1,313	4	0,975	1	0,824	1
2,60	1	1,734	2	1,256	2b	0,962	1	0,818	1
2,51	5	1,673	4	1,226	3	0,948	1	0,810	1
2,38	4	1,632	2	1,168	1	0,939	2	0,804	1
2,29	2	1,615	2	1,158	1	0,917	3	0,801	1
2,24	2	1,595	2	1,139	3	0,895	1	0,798	1
2,14	5								

EUXENITA-POLYCRASA

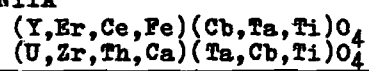
(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,30	1	2,025	0,5	1,436	2	1,143	0,5	0,963	1
5,16	2	1,970	0,5	1,400	0,5	1,119	0,5	0,960	1
3,66	3	1,935	1	1,391	0,5	1,110	1	0,941	2
3,36	2	1,889	2	1,359	1	1,100	1	0,916	3
2,98	10	1,823	4	1,336	2	1,091	0,5	0,901	1
2,77	2	1,769	3	1,311	1	1,080	2	0,890	1
2,61	0,25	1,723	4	1,292	1	1,057	1	0,881	1
2,58	2	1,679	0,5	1,273	0,5	1,046	1	0,864	1
2,54	0,5	1,635	3	1,256	0,25	1,030	0,5	0,857	1
2,43	3	1,605	1	1,241	0,5	1,024	2	0,852	0,5
2,30	1	1,583	0,5	1,222	2	1,015	1	0,848	1
2,252	0,25	1,560	1	1,216	1	1,008	0,5	0,839	2
2,199	1	1,522	0,25	1,203	1	0,996	1	0,820	1
2,182	1	1,501	0,25	1,182	2	0,986	1	0,808	2
2,106	2	1,487	4	1,173	2	0,981	0,5	0,798	0,5
2,071	0,25	1,457	1	1,156	3	0,968	0,5	0,782	1

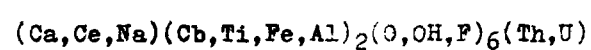
FERGUSONITA-FORMANITA

(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,05	MF	2,20	d	1,64	F	1,52	md	1,30	md
2,71	F	1,89	MF	1,57	F	1,38	md	1,22	F
2,59	F								

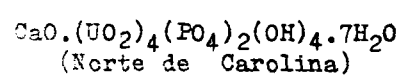
FERSMITA



(5)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,449	6	2,279	1	1,804	9	1,489	2	1,245	1
5,345	9	2,247	5	1,789	7	1,482	2	1,222	3
3,762	21	2,145	4	1,786	8	1,476	5	1,211	11
3,427	9	2,117	1	1,771	8	1,427	1	1,192	1
3,049	100	2,087	5	1,691	6	1,387	4	1,183	13
2,864	8	2,004	3	1,629	4	1,380	2	1,158	1
2,684	4	1,967	10	1,626	6	1,363	1	1,145	1
2,606	7	1,929	3	1,580	4	1,334	1	1,133	1
2,514	8	1,916	1	1,537	2	1,229	1	1,126	1
2,493	14	1,899	1	1,527	15	1,256	6	1,121	3
2,385	1	1,882	9	1,512	3	1,248	1	1,107	1
2,367	1	1,862	1	1,502	1				

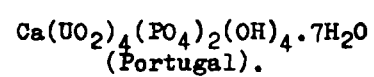
POSFURANILITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,16	1	3,83	1	2,43	2	1,828	1	1,375	1
7,83	10	3,44	1	2,24	0,5	1,771	1	1,358	0,5
7,20	0,5	3,36	2	2,21	1	1,719	3	1,304	1
6,33	1	3,12	6	2,16	1	1,672	0,5	1,282	1
5,83	8	3,07	4	2,10	0,5	1,656	1	1,252	1
5,37	0,5	2,94	2	2,08	2	1,585	1	1,236	0,5
4,96	1	2,86	6	2,04	1	1,537	2	1,209	0,5
4,72	2	2,71	1	2,00	1	1,506	0,5	1,197	0,5
4,33	3	2,59	1	1,895	5	1,433	1	1,179	1
3,97	9	2,46	1	1,852	1				

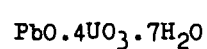
FOSFURANILITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,34	3	4,73	2	3,96	6	3,44	2	3,10	6
7,91	10	4,42	3	3,88	3	3,37	1	2,93	1
5,83	5	4,30	1	3,81	3	3,15	6	2,88	6
4,92	0,5								

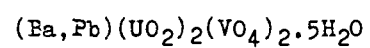
FOURMARIERITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,86	2	2,09	2	1,607	2	1,252	1	1,070	2
6,83	4	1,996	6	1,544	3	1,226	1	1,055	1
3,45	9	1,907	8	1,508	1	1,192	1	1,030	1
3,09	10	1,817	2	1,486	2	1,177	2	1,012	1
2,73	4	1,729	7	1,376	2	1,142	1	0,994	1
2,44	6	1,687	2	1,346	3	1,127	1	0,974	1
2,26	5	1,669	2	1,309	2	1,114	1	0,945	2
2,15	2	1,645	3	1,284	2	1,102	1		

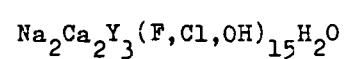
FRANCEVILLITA



(16)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,30	10	2,98	8	2,01	4	1,67	1	1,432	1
5,16	3	2,76	2	1,96	2	1,64	1	1,326	1
4,17	6	2,57	6	1,86	3	1,60	1	1,142	1
3,76	3	2,44	1	1,81	1	1,55	1	1,075	1
3,51	1	2,32	1	1,76	1	1,493	2	1,043	1
3,27	4	2,22	1	1,72	1	1,482	1	1,032	
3,21	3	2,10	5						

GAGARINITA

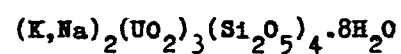


(1)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,24	3	2,60	1	1,962	2	1,668	—	1,460	2
3,00	5	2,28	2	1,763	2	1,518	1	1,435	1
2,92	5	2,086	9	1,717	10	1,498	2	1,334	2

GASTUNITA

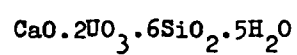
(9)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,10	8	3,84	5	2,81	2	2,20	4	1,903	5
7,12	10	3,56	9	2,51	3	2,18	2	1,872	2
6,59	1	3,31	7	2,41	4	2,10	4	1,830	2
5,57	7	3,18	7	2,38	5	1,99	3	1,778	4
4,83	3	3,13	1	2,29	5	1,973	4	1,743	3
4,58	5	2,99	4	2,24	3	1,927	3	1,725	4
4,45	2	2,91	7						

HAIWEEITA

(8)

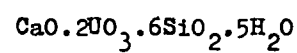


(De granito).

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,14	10	4,42	6	2,81	1	1,979	1	1,686	1
8,05	2	3,82	2	2,62	2	1,923	1	1,659	0,5
7,05	4	3,54	4	2,506	0,5	1,898	1	1,628	0,5
5,53	2	3,30	3	2,393	2	1,854	0,5	1,598	1
5,06	1	3,19	5	2,28	2	1,829	1	1,559	1
4,90	0,5	3,106	5	2,21	1	1,781	1	1,492	0,5
4,556	6	2,905	3	2,11	1	1,732	1	1,454	0,5

HAIWEEITA

(8)



(Ambiente lacunar)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,26	10	3,64	0,5	2,503	0,5	2,01	1	1,650	1
7,97	2	3,54	3	2,386	2	1,923	1	1,626	0,5
7,09	3	3,30	3	2,28	2	1,892	1	1,592	1
5,54	2	3,18	4	2,22	2	1,852	1	1,558	1
5,06	1	3,00	3	2,188	2	1,825	1	1,526	0,5
4,53	8	2,904	2	2,12	0,5	1,781	1	1,493	0,5
4,41	5	2,808	0,5	2,096	1	1,736	1	1,454	0,5
3,80	1	2,616	3	2,07	0,5	1,678	1		

HEINRICHITA $\text{Ba}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 10-12\text{H}_2\text{O}$ (21)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,11	8	3,41	7	2,11	5	1,731	1	1,200	2
5,07	8	2,78	1	1,939	1	1,677	1	1,161	2
4,54	1	2,53	2	1,866	1	1,589	2	1,146	2
3,60	10	2,25	5	1,799	1	1,530	2	1,122	2

HUTTONITA ThSiO_4 (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,29	3	3,29	6	2,48	3	1,953	4	1,749	4b
4,71	5	3,09	8	2,44	1	1,893	3b	1,692	2
4,23	6	2,98	3	2,19	4	1,857	2b	1,646	2
4,08	4	2,89	7	2,16	2	1,810	2	1,603	3
3,53	4	2,65	3	2,11	3	1,784	2	1,550	3

HUTTONITA ThSiO_4 (1)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,49	1	2,095	2	1,647	5	1,293	4	1,148	5
3,29	10	1,859	5	1,600	6	1,233	2	1,102	3
3,10	8	1,749	3	1,546	2	1,199	1	1,085	5
2,98	3	1,692	4	1,370	1	1,169	2	1,068	2

IANTHINITA $\text{UO}_2 \cdot 84 \cdot n\text{H}_2\text{O}$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,60	MF	2,89	M	2,25	md	1,95	md	1,74	d
3,79	F	2,68	md	2,14	md	1,92	md	1,67	F
3,59	F	2,61	d	2,06	md	1,89	d	1,64	md
3,35	F	2,53	d	2,02	d	1,83	md	1,34	d
3,28	M	2,38	md	1,98	md	1,79	d	1,32	d
2,96	d								

IRIGINITA $(\text{UO}_3) 2\text{MoO}_3 \cdot 4\text{H}_2\text{O}$ (4)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,390	5	2,142	6	1,533	5	1,206	6	1,165	6
3,222	10	1,836	6	1,249	6	1,188	6	1,129	8
2,625	6	1,693	5						

IRIGINITA

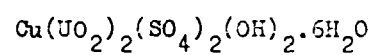
(10)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,19	10	3,09	5	2,07	6	1,628	9	1,185	5
3,30	5	2,61	6	1,962	5	1,529	7	1,127	8
3,20	9	2,14	8	1,688	6				

JOHANNITA

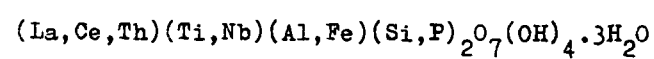
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,73	10	3,04	7	2,01	2	1,549	1	1,159	1
6,16	9	2,93	2	1,925	2	1,525	2	1,133	2
5,59	4	2,81	3	1,898	1	1,459	1	1,120	2
4,84	2	2,69	4	1,844	3	1,433	1	1,104	1
4,38	6	2,58	3	1,798	1	1,411	1	1,087	1
4,20	3	2,45	2	1,764	2	1,375	1	1,066	1
3,87	7	2,37	1	1,708	2	1,351	1	1,041	1
3,73	4	2,23	2	1,669	1	1,285	1	0,931	1
3,53	4	2,19	1	1,591	2	1,196	2	0,920	1
3,41	8	2,14	3	1,565	1	1,180	2	0,839	1
3,13	7	2,09	2						

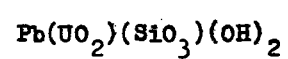
KARNASURTITA

(11)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,10	7	2,88	7	3,29	6	3,49	5	1,723	5

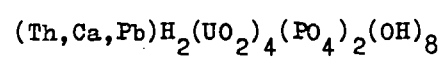
KASOLITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,61	6	2,42	2	1,623	1	1,247	1	0,969	1
6,19	2	2,37	2	1,592	1	1,235	1	0,949	1
5,31	4	2,18	3	1,565	1	1,200	1	0,943	1
4,76	2	2,11	2	1,532	1	1,183	1	0,930	1
4,19	8b	2,05	3b	1,497	1	1,147	2	0,920	1
3,53	7	1,962	5	1,476	2	1,114	2	0,909	1
3,38	1	1,913	1	1,456	3	1,086	1	0,899	1
3,26	10	1,876	2	1,397	1	1,049	1	0,877	2
3,07	5	1,847	1	1,366	2	1,035	1	0,870	1
2,93	9	1,826	1	1,329	2	1,017	1	0,838	2
2,73	3	1,741	4	1,300	2	1,004	1	0,831	1
2,64	3	1,677	5	1,277	1	0,993	1	0,809	2
2,47	3	1,656	2	1,262	1	0,976	1	0,803	1

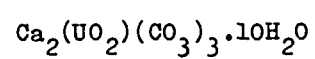
KIUNITA



(9)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,27	MF	5,88	M	3,94	M	3,08	F	2,87	F
7,96	F	4,43	M	3,86	M				

LIEBIGITA

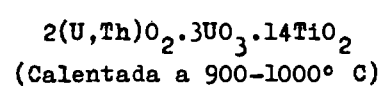


(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,68	9	3,95	1	2,77	1	2,02	1	1,561	2
8,27	1	3,75	2	2,66	1	1,998	5	1,533	1
6,81	10	3,58	3	2,57	3	1,957	1	1,484	1
6,11	2	3,33	5	2,44	1	1,911	1	1,473	2
5,40	9	3,31	5	2,37	2	1,884	1	1,437	1
4,95	1	3,19	1	2,30	2	1,830	1	1,416	1
4,55	6	3,10	6	2,26	2	1,716	5	1,397	1
4,17	1	3,02	1	2,15	4	1,670	3	1,347	2
4,04	2	2,84	1	2,10	1				

LODOCHNIKITA

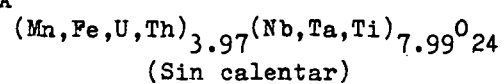
(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,079	5	2,017	7	1,979	7	1,749	5	1,650	7
2,419	6								

MANGANOMOSSITA

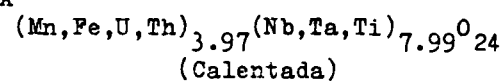
(5)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,66	3	2,505	1	2,109	<1	1,751	1	1,461	2b
3,325	<1	2,38	<1	1,824	<1	1,721	2	1,384	<1
2,98	5	2,221	<1	1,773	<1	1,551	1	1,338	<1
2,585	1								

MANGANOMOSSITA

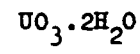
(5)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,97	2	2,238	<1	1,578	<1	1,245	2	1,0445	1b
5,30	1	2,208	2	1,5395	5	1,224	3	1,0335	4b
4,62	<1	2,081	3	1,4855	2	1,195	5	1,022	2b
3,66	6	2,045	1	1,471	4	1,163	1	1,0125	1b
3,57	1	1,900	3	1,4545	5	1,139	2	0,995	4b
3,30	2	1,835	4	1,431	<1	1,1235	1	0,980	3b
3,10	<1	1,801	<1	1,398	<1	1,1165	1	0,958	2b
2,97	10	1,7715	5	1,380	3	1,103	4	0,932	3b
2,852	3	1,7405	3	1,350	<1b	1,091	1b	0,925	3b
2,54	2	1,725	6	1,314	2	1,080	2b	0,916	3b
2,49	4	1,6745	<1	1,285	<1	1,059	<1b	0,904	1b
2,388	3	1,6125	<1b	1,272	1				

MASUYITA

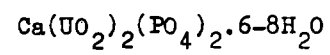
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,53	1	3,92	2	2,51	5	1,784	4d	1,510	2
7,10	10	3,54	8	2,38	2	1,727	2	1,421	1d
6,43	2	3,15	9	2,06	1	1,697	1	1,380	1md
4,80	1	2,97	1	1,984	6	1,662	1	1,349	2
4,35	4	2,74	3	1,908	3	1,598	2	1,329	2

META-AUTUNITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,51	10	2,68	1	2,10	3	1,599	4	1,254	1
5,39	7	2,61	3	2,04	3	1,568	2	1,186	1b
4,96	5	2,51	2	1,941	2	1,529	3b	1,166	1
4,28	6	2,47	2	1,893	1	1,454	2	1,153	1
3,63	8	2,38	3	1,802	2	1,379	1	1,126	1
3,50	9	2,25	2	1,757	3b	1,346	2	1,109	1
3,24	8	2,21	3	1,711	2	1,328	2	1,096	1
2,94	4	2,14	3	1,658	1b	1,283	1	1,065	1

META-HAIWEEITA

(21)

(Forma deshidratada)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,81	5	3,81	2	2,78	0,5	2,11	0,5	1,721	1
7,97	0,5	3,52	5	2,38	2	2,08	0,5	1,680	0,5
7,31	0,5	3,28	4	2,36	2	1,982	0,5	1,648	0,5
6,98	10	3,16	5	2,268	1	1,963	0,5	1,585	0,5
5,85	5	3,00	3	2,22	0,5	1,892	0,5	1,546	1
4,54	4	2,90	5	2,18	0,5	1,772	1		

META-HEINRICHITA $\text{Ba}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$ (21)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,50	4	3,28	6	2,41	4	1,673	5	1,249	2
8,75	10	3,16	1	2,22	5	1,575	5	1,233	2
5,46	9	3,02	1	2,15	4	1,478	3	1,215	1
5,00	2	2,97	3	2,10	1	1,446	2	1,176	2
4,40	9	2,76	1	2,02	5	1,418	3	1,118	2
3,73	10	2,71	4	1,962	1	1,382	2	1,107	2
3,54	5	2,57	2	1,761	3	1,313	1	1,095	2
3,46	1	2,48	1	1,707	2	1,273	1		

META-KAHLERITA $\text{Fe}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$ (21)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,04	4	3,59	10	2,84	3	2,15	5	1,419	2
8,55	9	3,45	4	2,73	1	2,11	5	1,381	2
5,11	5	3,30	1	2,54	3	1,785	3	1,367	2
4,68	0,5	3,21	0,5	2,27	4	1,607	3	1,261	1
4,29	6	3,10	2	2,21	1	1,568	2	1,199	0,5
3,96	2	3,01	3						

META-KIRCHHEIMERITA $\text{Co}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$ (14)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,55	10	3,94	3	3,00	6	2,15	4	1,607	4
5,07	6	3,56	10	2,52	5	1,787	4	1,570	2
4,30	6	3,41	5	2,27	4				

META-NOVACEKITA $\text{Mg}(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot n\text{H}_2\text{O}$ (21)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,18	3	3,56	10	1,789	6	1,562	4	1,150	1
8,55	10	3,01	6	1,723	1	1,372	5d	1,138	1
5,04	5d	2,54	5	1,693	1	1,217	2	1,019	4d
4,27	5	2,27	3	1,610	4	1,201	2	0,997	4d
3,93	0,5	2,14	8						

META-TORBERNITA $\text{Cu}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 6\text{H}_2\text{O}$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,66	9	2,20	2	1,459	1	1,151	2	0,919	1
6,57	1	2,16	3	1,441	2	1,109	1	0,910	1d
5,42	6	2,12	2	1,411	3	1,094	1	0,897	2
4,96	6	2,05	3	1,384	2	1,083	1	0,883	1
4,32	5	1,981	3	1,360	3	1,070	2	0,867	1
3,86	1	1,888	1	1,331	2	1,057	1	0,855	1
3,69	10	1,837	2	1,310	2	1,044	1	0,842	2
3,51	7	1,808	1	1,261	1d	1,035	1	0,832	1
3,24	8	1,771	2	1,227	1	1,022	2	0,830	1
2,94	3	1,750	1	1,217	1	1,004	1	0,820	1
2,67	4	1,730	1	1,207	1	0,982	2	0,807	1
2,53	3	1,630	3	1,195	1	0,964	1	0,792	1
2,47	1	1,608	1	1,181	1	0,945	2	0,788	2
2,37	2	1,580	2	1,159	2	0,928	2	0,787	1
2,25	1	1,549	4						

META-TYUYAMUNITA $\text{Ca}(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 3\text{H}_2\text{O}$ (19)
(Colorado)

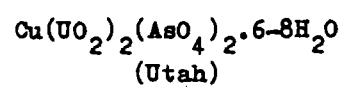
d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,51	MF	3,58	d	2,35	md	1,91	d	1,69	d
6,56	d	3,26	Mb	2,17	md	1,88	d	1,66	d
5,19	d	3,05	Mb	2,12	db	1,85	d	1,57	md
4,48	d	2,81	d	2,05	d	1,77	d	1,53	md
4,22	F	2,58	d	1,99	d	1,73	d	1,50	md
3,77	d	2,50	md	1,95	d				

META-URANOCIRCITA $\text{Ba}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,19	7	3,39	2	2,41	0,5	2,01	4	1,676	0,5
5,37	6	3,21	5	2,35	1	1,924	3	1,589	5
4,90	3	2,91	3	2,18	2	1,883	0,5	1,559	1
4,21	6	2,67	0,5	2,12	1	1,796	3	1,518	5
3,58	10	2,59	4	2,08	7	1,741	3		

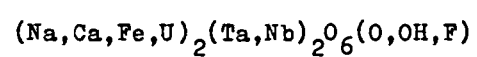
META-ZEUNERITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,93	10	3,12	1	2,19	2	1,656	4	1,265	1
6,56	1	3,01	3	2,15	2	1,605	3	1,247	1
5,95	1	2,77	2	2,09	4	1,570	5	1,225	1
5,54	6	2,71	2	2,01	4	1,429	2	1,209	1
5,04	5	2,59	3	1,937	1	1,406	2	1,176	2
4,35	3	2,52	4	1,855	2	1,382	3	1,161	1
4,15	1	2,42	3	1,797	3	1,358	2	1,130	1
3,72	9	2,30	1	1,749	2	1,329	2	1,092	1
3,56	7	2,26	2	1,695	2	1,290	1	1,055	1
3,30	8								

MICROLITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,98	6	1,705	0,5	1,194	3	1,009	0,5	0,848	0,25
3,69	0,25	1,585	0,25	1,165	3	1,003	3	0,837	2
3,11	4	1,563	8	1,141	1	0,972	0,5	0,824	3
2,98	10	1,500	2	1,130	0,25	0,939	1	0,822	1
2,58	3	1,455	2	1,112	0,5	0,921	2	0,797	1
2,38	1	1,352	2	1,093	1	0,911	2	0,795	3
2,11	0,25	1,302	2	1,064	3	0,881	4	0,785	2
1,999	2	1,272	0,5	1,047	1	0,869	3	0,778	1
1,836	8	1,225	0,25	1,018	0,5	0,859	1	0,777	0,5
1,757	2	1,202	0,25						

MINERAL D

(Contiene U y As)

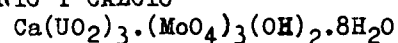
(21)*

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,55	8d	3,94	2d	3,51	10d	2,96	10d	1,895	1d
4,83	4d								

MINERAL E (Contiene U y As) (21)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,76	2	2,94	1	2,26	1	1,658	3	1,243	2
5,53	8	2,88	4	2,21	2d	1,496	2	1,134	1
5,13	2	2,73	2	2,07	2	1,484	1	1,105	2
4,95	10	2,63	1	2,03	2	1,449	2d	1,097	2
4,35	2	2,58	4	1,887	7	1,329	1d	1,076	1d
3,96	2	2,46	1	1,834	2	1,303	1	1,061	1d
3,31	8	2,41	1	1,676	3	1,256	2	1,047	2d
3,01	4	2,32	1						

MOLIBDATO DE URANIO Y CALCIO (24)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,34	5	3,56	3	2,68	3	1,99	5	1,571	2
7,85	10	3,21	8	2,43	3	1,855	4	1,501	1
4,29	3	2,90	3	2,24	2	1,603	2	1,473	1
3,89	6								

MONACITA (Ce,La,Y,Th)(PO₄) (15)
(Chochi-Wan, Corea)

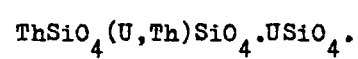
d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,23	4	3,09	10	2,19	4	1,875	6	1,651	1
4,72	4	2,99	2	2,139	6	1,800	2	1,630	1
4,17	6	2,88	7	1,969	5	1,766	4	1,605	1
3,52	5	2,61	2	1,963	1	1,746	6	1,541	4
3,31	7	2,45	3	1,899	2	1,695	4		

MONACITA (Ce,La,Y,Th)(PO₄) (15)
(Perdatsch, Suiza)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,45	d	1,862	F	1,614	F	1,285	d	1,164	M
3,32	F	1,742	M	1,545	d	1,237	F	1,151	F
3,11	M	1,686	M	1,369	MF	1,203	M	1,099	M
2,405	d	1,657	F	1,301	F	1,180	d	1,089	F
2,115	d								

NENADKEVITA

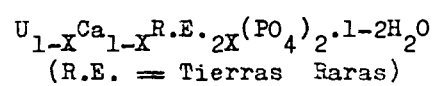
(24)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,26	1	3,20	2	2,08	1	1,655	0,5	1,360	1
4,65	4	3,06	3	1,96	1	1,597	1	1,320	1
4,16	0,5	2,90	10	1,883	6	1,534	1	1,283	1
3,79	1	2,47	1	1,810	1	1,482	0,5	1,229	1
3,50	4	2,39	0,5	1,746	4	1,456	1	1,178	1
3,29	1	2,19	4	1,689	0,5	1,400	1	1,152	1

NINGOYITA

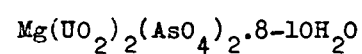
(7)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
12,0	md	3,45	d	2,33	md	1,845	d	1,547	d
6,8	md	3,38	M	2,26	md	1,740	d	1,505	md
6,35	d	3,19	md	2,22	md	1,728	md	1,451	md
5,99	d	3,02	MF	2,13	F	1,692	d	1,343	d
5,65	d	2,81	F	2,01	md	1,681	d	1,307	d
4,49	d	2,73	d	1,926	md	1,653	d	1,262	md
4,33	M	2,69	d	1,903	d	1,634	md	1,247	md
4,02	md	2,35	d						

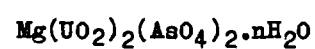
NOVACEKITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,15	10	4,50	1d	3,03	2	2,15	2	1,698	1d
8,97	2	3,83	1	2,89	1	2,01	2	1,596	3
6,80	4	3,58	9	2,79	1	1,939	1d	1,552	1
5,68	2	3,35	5	2,52	3	1,787	3	1,508	1
5,06	8	3,17	1	2,26	3				

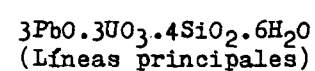
NOVACEKITA



(21)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,68	5	3,54	10	2,47	4	1,673	2	1,230	1
9,92	8	3,31	6	2,24	4	1,579	4	1,181	1
5,00	7	3,17	1	2,12	3	1,416	1	1,124	2
4,85	3	2,88	2	1,852	1	1,342	1	1,102	1
4,54	2	2,64	2	1,770	3				

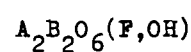
ORLITA



(15)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,356	5	3,226	10	1,967	5	1,849	5	1,678	7

PANDAITA

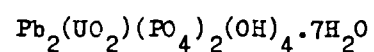


(22)

A = (Ba, Sr, Ca, Ce, Na, Fe, K, Th)
B = (Nb, Ta, Ti)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,09	80	2,152	5	1,590	70	1,244	5	1,158	10
3,18	50	2,029	20	1,521	20	1,218	2	1,106	10
3,044	100	1,864	70	1,477	15	1,210	50	1,077	40
2,630	40	1,781	15	1,373	15	1,180	50	1,061	10
2,424	1	1,609	5	1,319	15				

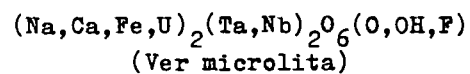
PARSONSITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,16	2	3,44	4	2,55	2	1,990	1	1,629	1
6,92	1	3,28	8	2,45	1	1,961	1	1,610	1
6,03	2	3,15	3	2,37	1	1,921	0,5	1,578	1
5,75	2	3,02	3	2,32	1	1,888	2	1,506	1
5,16	2	2,95	4	2,27	2	1,852	5	1,433	2
4,87	1	2,81	4	2,22	3	1,788	4	1,402	1
4,25	10	2,73	1	2,13	6	1,728	4	1,370	2
3,97	4	2,63	3	2,10	2	1,661	6		

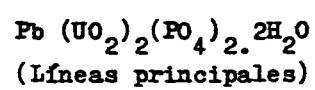
PIROCLORO



(19)

PRJEVALSKITA

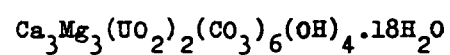
(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,490	5	3,610	10	1,960	5	1,530	6	1,148	5
9,080	9	2,629	5	1,619	6	1,349	5	1,138	5

RABBITTITA

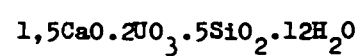
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
19,4	3	7,79	8	5,83b	5	4,51	1	3,84	3
18,6	1	7,15	3	5,72	5	4,37	8	3,71b	1
11,28	5	6,81	1	5,22	3	4,28	1	3,60	3
8,63	3	6,47	3	4,81	5	4,05	3	3,33	5
8,24	10	6,35	1	4,71	7	4,03	3		

RANQUILITA

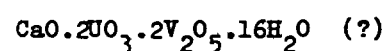
(11)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,26	MF	3,34	M	2,281	d	1,838	d	1,535	md
8,12	F	3,21	M	2,222	d	1,811	d	1,497	d
6,62	d	3,03	MF	2,186	M	1,781	d	1,453	md
5,10	d	2,81	d	2,067	md	1,745	d	1,351	d
4,63	M	2,63	d	1,980	d	1,658	d	1,324	d
4,47	MF	2,508	md	1,934	d	1,626	md	1,310	md
3,68	d	2,405	d	1,892	d	1,600	d	1,294	md
3,58	M	2,332	d	1,863	d	1,566	d		

RAUVITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,70	10	3,49	4	2,22	1	1,832	1	1,624	1
5,83	1	2,95	5	2,10	1	1,714	1	1,543	1
3,87	2	2,62	3	1,979	1				

HENARDITA $\text{Pb}(\text{UO}_2)_4(\text{PO}_4)_2(\text{OH})_4 \cdot 7\text{H}_2\text{O}$ (19)

d	A°	I	d	A°	I	d	A°	I	d	A°	I
10,5		4	3,38		7	2,17		3	1,78		3
7,97		10	3,13		8	2,11		1b	1,72		4
6,37		3	3,09		8	2,09		4b	1,70		2
5,83		8	2,70		1b	2,05		4	1,68		2
4,98		4	2,59		2	2,01		4	1,66		4
4,80		4	2,54		2	1,95		1b	1,60		4
4,37		7	2,45		3	1,90		6b	1,55		5b
3,99		9	2,27		3	1,85		3	1,514		3b
3,82		5	2,22		3	1,82		2			

RUTHERFORDINA $(\text{UO}_2)\text{CO}_3$ (19)

d	A°	I	d	A°	I	d	A°	I	d	A°	I
4,60		10	2,51		1	1,95		1	1,603		1
4,29		8	2,41		2	1,914		2	1,588		1
3,90		6	2,32		3	1,874		2	1,510		2
3,21		9	2,15		4	1,734		3	1,435		2
2,64		4	2,05		5	1,658		1	1,388		3

SABUGALITA $\text{HAl}(\text{UO}_2)_4(\text{PO}_4)_4 \cdot 16\text{H}_2\text{O}$ (19)

d	A°	I	d	A°	I	d	A°	I	d	A°	I
9,69		10	4,39		4	3,06		0,5	2,19		6
6,56		1	3,47		8	2,82		1	1,792		1
5,59		1	3,36		1	2,45		2	1,726		1
4,86		9	3,22		0,5	2,39		2			

SALEEITA $\text{Mg}(\text{UO}_2)_2(\text{PO}_4)_2 \cdot 8-10\text{H}_2\text{O}$ (19)

d	A°	I	d	A°	I	d	A°	I	d	A°	I
9,85		10	3,64		1	2,65		1b	2,14		1
8,60		3	3,49		9	2,45		6	2,10		1
6,50		2	3,37		3	2,39		5	2,04		1
5,46		3	3,23		5	2,30		2	1,919		2d
4,95		8	3,09		2	2,25		1	1,860		1
4,51		4	2,95		5	2,19		7	1,798		3
4,19		2	2,84		1						

SAMARSKITA (Y,Er,Ce,U,Ca,Fe,Pb,Th)(Cb,Ta,Ti,Sn)₂O₆ (15)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,91	50	2,30	20	1,67	70	1,37	50	1,19	100
3,48	50	2,15	50	1,64	50	1,35	60	1,17	70
3,16	70	2,04	50	1,62	50	1,31	20	1,16	90
2,94	90	2,00	50	1,56	100	1,30	50	1,11	70
2,84	90	1,90	50	1,51	70	1,28	50	1,10	70
2,74	20	1,85	70	1,49	70	1,26	60	1,09	70
2,55	20	1,82	70	1,45	50	1,24	20	1,08	90
2,48	70	1,72	50	1,42	90	1,22	70	1,06	90
2,40	20	1,69	70						

SAMIRISITA (U,Ca)(Nb,Ta,Ti)₃O₈.nH₂O (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,05	6	2,81	1	1,83	5	1,59	1	1,25	1
3,55	2	2,61	1	1,71	3	1,48	2	1,20	1
3,20	10	2,50	8	1,67	3	1,36	2	1,153	2
2,99	2	2,02	2						

SCHOEPIITA 2UO₃.5H₂O (19)

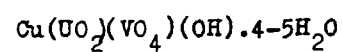
d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,49	10	2,83	2	2,05	6	1,604	3	1,347	1
6,74	1	2,60	7	1,981	1	1,561	1	1,298	2
6,09	2	2,48	3	1,910	2	1,523	1	1,231	1
4,08	2	2,35	2	1,835	4	1,481	2	1,211	2
3,64	8	2,27	1	1,766	3	1,457	2	1,199	2
3,26	9	2,21	1	1,681	1	1,393	2	1,170	3
3,01	1	2,10	4	1,648	5	1,373	3	1,141	2

SCHROECKINGERITA NaCa₃(UO₂)(CO₃)₃(SO₄)F.10H₂O (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
14,28	3	4,796	8	3,591	1	3,13	1	2,706	1
8,48	7	4,167	2	3,362	2	2,876	7	2,393	2
7,26	10	4,044	1	3,303	1	2,767	1	2,304	1
5,421	2								

SENGIERITA

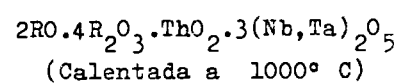
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,82	MF	3,735	F	2,970	M	2,398	d	2,087	M
5,75	M	3,262	d	2,901	md	2,345	md	2,051	d
5,02	d	3,197	F	2,832	M	2,267	md	2,009	M
4,91	MF	3,179	F	2,744	d	2,163	d	1,971	md
4,179	M	3,144	F	2,550	M	2,124	M	1,951	md
4,037	M	3,094	F	2,495	md				

SINICITA

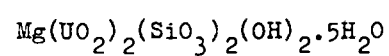
(6)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,04	4	2,56	2	2,04	2	1,81	2	1,63	8
2,94	10	2,45	2	1,92	2	1,74	1	1,58	6

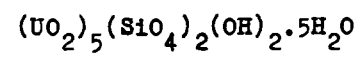
SKŁODOWSKITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,42	10	3,27	7	2,27	0,5	1,918	2	1,672	0,5
6,37	2	3,00	6	2,22	2	1,884	1	1,647	1b
5,91	5	2,87	5	2,19	2	1,848	2	1,623	2
4,82	4	2,80	2	2,17	2	1,821	0,5	1,593	1b
4,51	1	2,74	2	2,13	3	1,801	1	1,563	1
4,33	4	2,70	1	2,09	3	1,768	1b	1,540	1
4,19	8	2,66	1	1,985	2	1,740	1b	1,512	1
4,00	5	2,52	1	1,961	2	1,707	1b	1,490	1
3,52	6	2,34	2						

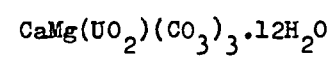
SODDYITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,14	8	2,47	6	1,855	5	1,523	3	1,220	2
4,71	3	2,39	1	1,823	1	1,503	1	1,148	2
4,48	9	2,32	2	1,772	2	1,463	1	1,082	2
3,73	2	2,26	2	1,731	1	1,406	3	1,055	1
3,32	10	2,18	1	1,699	3	1,374	1	1,038	1
3,22	2	2,09	4	1,664	4	1,353	2	1,018	1
2,95	3	2,04	3	1,641	4	1,339	1	0,996	1
2,78	2	1,975	4	1,601	2	1,289	1	0,940	1
2,69	7	1,908	4	1,551	1	1,268	3		

SWARTZITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,76	10	4,62	2	3,31	1	2,61	5	1,817	5
7,31	9	4,46	2	3,25	1	2,28	4	1,707	8
6,37	5	4,37	2	3,19	7	2,23	3	1,375	2
5,83	1	3,85	2	3,11	2	2,19	2	1,268	2
5,50	10	3,66	7	3,04	1	2,10	2	1,217	3
5,13	1	3,53	5	2,91	8	2,06	8	0,962	2
4,82	8	3,39	1	2,82	2				

THORIANITA

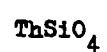


(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,21	10	1,611	2	1,141	4	0,932	3	0,808	2
2,78	4	1,396	2	1,076	4	0,884	4	0,784	7
1,971	8	1,280	4	0,988	3	0,853	3	0,776	8
1,682	9	1,248	4	0,945	6	0,844	3		

THORITA

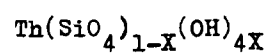
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,69	9	1,787	5	1,282	7	1,016	0,5	0,875	1b
3,56	10	1,749	6	1,264	0,5	0,990	0,5d	0,865	2
2,84	7	1,672	3	1,182	7	0,984	2d	0,861	0,5b
2,66	8	1,599	5	1,168	1	0,972	3d	0,840	1b
2,52	5	1,571	4	1,145	3	0,950	5b	0,839	1
2,22	0,5	1,486	6	1,123	7	0,918	4b	0,819	3b
2,01	5	1,438	7	1,059	0,5	0,900	3b	0,805	1b
1,89	6	1,396	6	1,049	0,5	0,890	2b	0,798	5b
1,84	10	1,336	8	1,024	3				

TOROGUMMITA

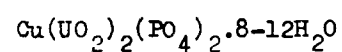
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,695	9	2,000	4	1,565	1	1,172	4d	1,021	
3,537	10	1,869	3	1,469	2	1,130	1d	1,013	1d
2,821	4	1,818	6	1,431	3	1,112	2	0,976	3d
2,653	6	1,767	1	1,379	2	1,088	0,5d	0,953	
2,499	3	1,740	1	1,326	3	1,055	0,5d	0,951	2d
2,336	0,5	1,653	1	1,267	2	1,039	0,5d	0,908	3d
2,203	4	1,582	1						

TORBERNITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,3	10	3,67	4	2,85	2	2,37	1	2,158	2
6,61	4	3,58	9	2,73	1	2,32	1	2,040	3
5,18	3	3,51	8	2,67	1	2,24	1	1,917	1
4,94	9	3,10	1	2,48	1	2,21	3	1,873	1
4,48	4	2,90	3	2,41	2				

TROEGERITA $\text{H}_2(\text{UO}_2)_2(\text{AsO}_4)_2 \cdot 8\text{H}_2\text{O}$ (?) (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,59	10	2,53	6	1,787	4	1,473	0,5	1,252	2
5,50	7	2,43	5	1,752	4	1,462	1	1,239	2
5,04	4	2,30	2	1,705	1	1,437	4	1,230	2
4,35	7	2,26	3	1,685	0,5	1,427	4	1,217	2
3,79	9	2,19	7	1,658	7	1,388	6	1,211	0,5
3,56	6	2,16	4	1,643	2	1,360	3	1,182	5
3,30	8	2,10	5	1,613	3	1,335	4	1,169	4
3,14	0,5	2,01	7	1,598	3	1,316	1	1,139	0,5
2,99	5	1,931	3	1,576	7	1,297	0,5	1,133	2
2,76	2	1,873	2	1,541	0,5	1,285	3	1,122	4
2,70	7	1,845	3	1,508	0,5	1,275	0,5	1,110	2
2,59	3	1,807	4	1,492	1	1,265	0,5	1,098	4

TYUYAMUNITA $\text{Ca}(\text{UO}_2)_2(\text{VO}_4)_2 \cdot 5-8 \text{H}_2\text{O}$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,18	10	3,37	3	2,55	2	2,16	1	1,964	1
6,62	3	3,20	5	2,48	1	2,10	1	1,911	2
5,02	9	3,12	3	2,28	1	2,04	4	1,870	1
4,02	2	2,69	1						

UFERTITA $20 \text{FeO} \cdot 8\text{Fe}_2\text{O}_3 \cdot 4\text{R}_2\text{O}_3 \cdot \text{UO}_2 \cdot 74\text{TiO}_2$ (15)
R = Tierras Raras
Calentada a 700° C
(Líneas principales)

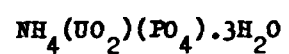
d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
2,892	7	2,772	6	1,821	6	1,616	9	1,452	10

UMOHITA $(\text{UO}_2)(\text{MoO}_4) \cdot 4\text{H}_2\text{O}$ (19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
14,29	52	4,30	3	3,22	10	2,402	1	1,807	8
8,57	3	3,72	2	3,06	7	2,149	2	1,606	3
7,19	264	3,60	62	2,891	17	2,061	45	1,443	4
4,80	176								

URAMPHITA

(6)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,78	10	2,75	8	2,12	8	1,399	7	1,267	7
3,24	7	2,22	9	1,694	9				

URANINITA

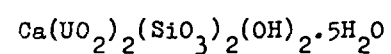
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,14	10	1,574	4	1,115	6	0,924	7	0,833	5
2,73	5	1,365	3	1,051	7	0,911	5	0,824	5
1,926	8	1,251	6	0,966	4	0,864	6	0,789	3
1,645	9	1,220	6						

URANOFANO

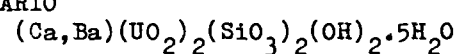
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,88	10	3,35	1	2,40	1	1,827	1	1,461	2
6,61	4	3,20	5	2,26	2	1,769	3	1,442	2
5,42	4	3,09	1	2,20	4	1,747	3	1,382	1
4,76	5	2,99	8	2,10	5	1,717	1	1,372	1
4,29	2	2,91	8	2,06	2	1,659	2	1,345	1
3,94	9	2,69	4	1,969	7	1,601	1	1,325	1
3,60	4	2,63	5	1,906	2	1,579	2	1,262	1
3,51	4	2,57	2	1,889	1	1,537	2	1,239	2
3,41	1	2,52	2	1,867	3	1,496	2		

URANOFANO CON BARIO

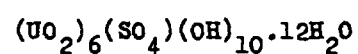
(24)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,93	8	2,88	4	2,34	1	1,997	5	1,610	2
3,99	6	2,70	1	2,23	4	1,848	2	1,557	2
3,58	4	2,69	1	2,14	5	1,810	3	1,274	2
3,38	4	2,54	1	2,05	1	1,660	1		

URANOPILITA

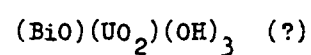
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,18	8	4,28	8	2,90	3	2,19	3	1,826	3
8,21	2	4,02	1	2,75	1	2,13	1	1,757	3
7,12	10	3,86	2	2,69	2	2,08	1	1,732	1
5,99	2	3,65	5	2,59	2	2,04	1	1,700	2
5,51	4	3,48	2	2,42	1	2,01	1	1,674	1
5,13	1	3,31	4	2,36	1	1,932	2	1,638	1
4,76	1	3,08	1	2,28	1	1,880	2	1,604	1
4,61	1	2,99	3	2,24	1				

URANOSPHERITA

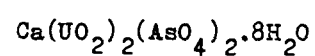
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,25	6	3,05	3	2,16	2	1,73	2	1,33	1
4,74	3	2,71	1	2,08	2	1,66	4	1,26	2
4,37	4	2,60	1	2,03	1	1,59	1	1,236	2
4,15	1	2,54	1	1,97	4	1,56	1	1,198	1
3,87	7	2,46	2	1,90	5	1,52	1	1,181	4
3,47	6	2,39	2	1,83	8	1,37	1	1,097	1
3,16	10	2,35	1	1,80	1	1,34	1	1,058	1

URANOSPINITA

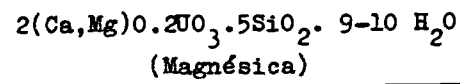
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,85	10	3,34	8	2,29	3	1,845	0,5	1,575	3
5,57	6	3,02	4	2,20	2	1,804	5	1,499	0,5
5,10	7	2,81	1	2,16	2	1,755	1	1,414	0,5
4,40	2	2,68	1	2,10	2	1,704	1	1,384	0,5
3,74	5	2,55	5	2,00	1	1,642	3	1,361	0,5
3,59	9	2,44	4	1,945	1	1,608	3		

URSILITA

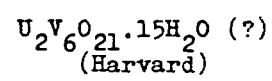
(6)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,98	10	3,37	8	2,42	6	2,07	9	1,798	6
4,58	8	3,06	10	2,30	9	1,981	6		

UVANITA

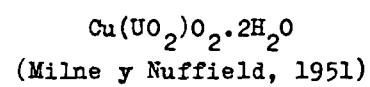
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,9	6	2,94	10	1,637	4	1,356	2	1,180	1
4,6	4	2,24	8	1,484	7	1,288	3	1,119	4
3,3	2	1,71	9						

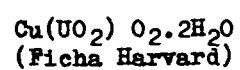
VANDENBRANDEITA

(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,06	4	2,19	0,5	1,579	0,5	1,253	2	1,028	0,5
4,29	10	2,15	0,5	1,557	1	1,246	0,5	1,020	0,5
3,85	2	2,09	3	1,527	1	1,227	1	1,012	0,5
3,72	2	1,967	2	1,498	1	1,197	0,5	1,003	0,5
3,33	2	1,913	1	1,471	3	1,173	0,5	0,990	1
3,07	1	1,851	3	1,438	0,5	1,156	0,5	0,978	0,5
2,92	8	1,823	0,5	1,420	0,5	1,129	0,5	0,968	0,5
2,77	0,5	1,793	1	1,398	0,5	1,096	2	0,954	1
2,56	4	1,751	0,5	1,348	2	1,076	2	0,944	1
2,48	0,5	1,708	1	1,333	0,5	1,068	0,5	0,939	1
2,40	0,5	1,685	0,5	1,317	3	1,055	0,5	0,931	1
2,36	1	1,657	0,5	1,300	0,5	1,044	0,5	0,927	0,5
2,29	1	1,624	2	1,276	0,5	1,038	0,5		

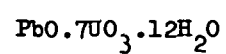
VANDENBRANDEITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
5,98	3	3,49	1	2,59	7	1,876	3	1,510	1
5,47	3	3,40	4	2,40	2	1,816	1	1,486	2
5,26	9	3,25	2	2,31	2	1,637	5	1,453	1
4,44	10	3,13	2	2,20	5	1,571	1	1,369	2
3,97	3	2,97	8	2,03	6	1,542	1	1,329	2
3,85	4	2,70	2	1,915	1				

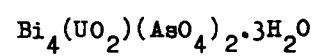
VANDENDRIESSCHEITA



(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
7,41	8	3,22	10	2,01	4	1,646	1	1,381	1d
6,49	2	2,83	2	1,886	1d	1,613	2	1,338	2
4,58	2d	2,55	4	1,811	3	1,563	1	1,304	1
4,27	1	2,43	3	1,783	3	1,524	2	1,266	2
3,94	1	2,32	2	1,734	2	1,420	1d	1,202	1
3,61	9	2,05	3	1,687	1				

WALFURGITA

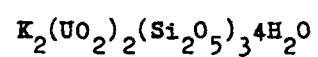


(19)

d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,65	1	4,10	0,5	3,05	5	2,24	1b	1,895	3b
9,9	4	3,97	1	2,72	4	2,19	3	1,852	3b
6,56	1	3,44	2	2,59	1b	2,12	2b	1,807	3b
5,64	1	3,38	2	2,50	1b	2,07	2b	1,774	3b
5,44	1	3,25	5	2,41	4b	2,002	3b	1,695	4
5,01	0,5	3,11	10	2,33	1b	1,922	2b		
4,87	1								

WEEKSITA

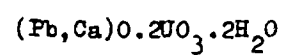
(10)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,98	8	3,79	0,5	2,80	3	2,13	4	1,854	0,5
7,87	1	3,55	7	2,69	0,5	2,11	4	1,831	2
7,11	10	3,34	4	2,51	3	1,994	4	1,791	3
6,17	1	3,30	7	2,41	4	1,973	3	1,778	4
5,57	9	3,20	5	2,37	5	1,922	3	1,763	0,5
4,83	3	3,13	1	2,28	5	1,905	4	1,741	3
4,58	4	3,06	1	2,24	4	1,899	4	1,726	1
4,48	3	2,99	4	2,20	3	1,872	1	1,689	4
3,84	4	2,91	6	2,17	0,5				

WOLSENDORFITA

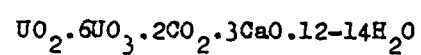
(17)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
6,93	F	3,13	F	2,25	M	1,896	Mb	1,699	md
6,02	M	3,09	MF	2,14	d	1,884		1,681	md
3,51	M	2,75	M	2,01	M	1,748	Mb	1,658	md
3,47	MF	2,45	Mb	1,998	d	1,732			

WYARTITA

(13)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,375	MF	4,97	md	3,47	M	2,94	d	2,050	d
8,60	d	4,71	d	3,35	M	2,60	M	1,995	d
7,61	M	4,31	d	3,27	F	2,53	md	1,964	d
5,71	md	3,71	d	3,16	md	2,47	md	1,921	md
5,205	F	3,55	M	2,99	M	2,205	d		

XENOTIMA

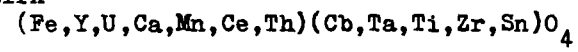
(15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,71	70	2,25	40	1,75	100	1,49	40	1,29	70
3,34	80	2,11	70	1,70	80	1,42	90	1,23	80
2,51	70	1,80	60	1,52	60	1,33	30	1,21	50
2,38	20								

YTTROTANTALITA

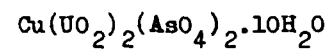
(12 y 15)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,25	20	1,98	20	1,65	20	1,31	20	1,16	100
3,11	50	1,94	50	1,63	20	1,29	50	1,10	50
2,98	100	1,90	20	1,59	50	1,25	20	1,08	50
2,72	20	1,83	70	1,56	100	1,22	20	1,06	100
2,58	50	1,75	20	1,49	50	1,21	20	1,00	20
2,01	50	1,72	50	1,47	20	1,19	100		

ZEUNERITA

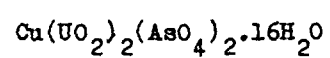
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,33	9	2,75	2	1,707	2	1,404	1	1,093	1
9,40	1	2,54	3	1,692	2	1,378	2	1,083	1
6,82	4	2,47	3	1,660	2	1,358	2	1,056	1
5,27	5	2,32	1	1,642	2	1,313	1	1,036	1
5,07	7b	2,27	3	1,605	3	1,293	1	1,022	1
4,58	2	2,19	3	1,583	1	1,270	1	0,997	1b
3,60	10	2,07	4	1,561	1	1,242	1	0,972	1
3,40	6	1,926	4	1,536	3	1,217	1	0,959	1
3,18	2	1,869	1	1,506	1	1,164	1	0,947	1
2,94	4	1,798	4	1,428	2	1,138	1d	0,929	1
2,86	1	1,772	1						

ZEUNERITA

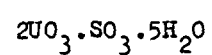
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
10,65	10	2,54	4	1,797	5	1,512	1	1,211	2
6,86	5	2,47	4	1,768	1	1,429	3	1,202	2
5,04	8	2,42	1	1,734	1	1,382	3	1,191	1
4,55	2	2,38	1	1,704	2	1,365	3	1,181	1
3,59	9	2,31	2	1,658	1	1,332	1	1,168	2
3,39	7	2,27	3	1,642	4	1,313	2	1,143	2
3,18	2	2,19	4	1,610	3	1,298	1	1,118	1
3,07	1	2,08	5	1,590	1	1,275	3	1,094	2
2,93	4	1,985	1	1,563	2	1,248	2	1,086	2
2,86	4	1,926	6	1,533	4	1,222	1	1,060	1
2,73	3	1,873	2						

ZIPPEITA PROPER

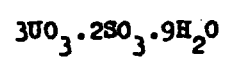
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
8,65	4	2,65	5	1,816	5	1,424	4	1,162	1
7,06	10	2,47	5	1,745	6	1,396	1	1,139	1d
6,45	2	2,34	2	1,694	1	1,367	1	1,106	2
5,44	4	2,21	4	1,666	1	1,326	1	1,093	2
4,27	5	2,14	3	1,632	1	1,299	1	1,067	1
3,88	3	2,09	2	1,598	5	1,258	1	1,056	1
3,63	4	2,05	5	1,563	2	1,236	1	1,037	1
3,51	8	1,935	6	1,519	2	1,219	1	1,024	1
3,12	9	1,876	2	1,494	1	1,198	1	1,011	1
2,86	6	1,856	2	1,458	2	1,180	1	1,001	1
2,71	2								

ZIPPEITA-LIKE

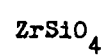
(19)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
9,61	1	3,99	1	2,66	3	2,002	4	1,749	4
7,31	10	3,66	9	2,53	4	1,96	2b	1,731	1
5,57	1	3,51	5	2,45	1	1,884	2b	1,701	4
4,77	1	3,22	1	2,25	2	1,855	1	1,621	2
4,27	1	3,15	8	2,22	2	1,821	2b	1,583	3
4,10	4	2,86	4	2,12	4	1,791	1b	1,517	1

ZIRCON

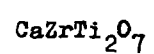
(12)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
4,434	45	1,751	11	1,290	5	1,0590	7	0,9321	1
3,302	100	1,712	40	1,259	8	1,0506	7	0,9201	2
2,650	7	1,651	14	1,248	3	1,0442	5	0,9157	4
2,518	45	1,547	4	1,1883	11	1,0015	1	0,8994	5
2,336	10	1,495	3	1,1672	2	0,9745	5	0,8915	5
2,217	8	1,477	8	1,1079	5	0,9713	5	0,8863	7
2,066	20	1,381	10	1,1006	5	0,9582	1	0,8561	5
1,908	14	1,362	7	1,0682	1	0,9532	1	0,8527	2

ZIRCONOLITA

(18)



d A°	I	d A°	I	d A°	I	d A°	I	d A°	I
3,176	3	2,506	4	1,792	9	1,156	1	1,118	1
2,914	10	1,980	9	1,517	1				

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