

## Catálogo de los sulfuros metálicos de Cataluña existentes en museos y colecciones de la región\*

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### RESUMEN

Se presenta una recopilación de los ejemplares de sulfuros metálicos de Cataluña que se encuentran en museos y colecciones de la región. Consta de tres listas ordenadas, respectivamente, por museos y colecciones, especies minerales y localidades. Entrando por cualquiera de las tres se encuentra la correspondiente referencia a las otras dos, de tal manera que puede hallarse fácilmente cualquier dato que se busque.

### RÉSUMÉ

On présente un recueil sur les sulfures métalliques de la Catalogne qui se trouvent dans des musées et collections de la région. Il comprend trois listes, classées par musées et collections, espèces minerales et localités. Dans chacune on trouve les références correspondentes aux autres deux, ce qui permet de trouver facilement n'importe quelle information.

### INTRODUCCIÓN

Al iniciar el estudio sistemático de los sulfuros metálicos de Cataluña, efectuamos una revisión previa de la gran cantidad de material bibliográfico que existe sobre el tema. El interés de los datos recopilados nos indujo a la publicación de los mismos, en la creencia que la labor llevada a cabo podría ser de utilidad para cuantos se interesan por la mineralogía de nuestro país.<sup>1</sup> El presente trabajo es la lógica continuación del anterior, de tal manera que entre las dos publicaciones puede hallarse fácilmente cualquier dato referente a especies minerales descritas, ejemplares existentes en museos y colecciones, localidades, autores y publicaciones sobre los sulfuros metálicos de Cataluña.

El trabajo se halla estructurado según tres relaciones ordenadas, respectivamente, por museos y colecciones, especies minerales y localidades. En la primera lista constan todos los ejemplares que se hallan en cada colección y sólo aquellos cuya existencia se ha comprobado, habiéndose suprimido todo ejemplar que, si bien constaba en ficha, no se ha podido localizar. Se cita el número de registro de todos ellos así

como su localidad de procedencia (en aquellos ejemplares que carecen de registro de entrada se ha puesto la indicación SN). Cabe indicar que en la Colección del Departamento de Cristalografía y Mineralogía de la Universidad de Barcelona, se utiliza el sistema de registro propuesto por Dana, o sea que, por ejemplo, si tenemos la referencia 2.6.1.1.51, sabemos que se trata del ejemplar número 51 de galena (2.6.1.1)<sup>2</sup>. Todas aquellas muestras que poseen más de un sulfuro metálico pueden hallarse entrando por cualquiera de las especies minerales que presentan.

En la relación por especies minerales, constan todos los museos en donde se encuentran cada una de las mismas, así como las localidades de procedencia de los ejemplares que se encuentran en cada colección concreta. Se citan asimismo todos aquellos minerales de los que se posee referencia bibliográfica,<sup>3</sup> aun cuando no exista ejemplar alguno en museos y colecciones, poniéndose en tal caso la indicación NR. En la referida lista, se ha añadido, al nombre y a la fórmula química la correspondiente numeración según la clasificación de Dana,<sup>4</sup> ya que ello es de interés para fines museológicos.

Finalmente, en la lista de localidades se citan las especies minerales de cada una de ellas que se hallan en las colecciones, indicándose concretamente en cuáles se encuentran.

Para facilitar el manejo, las referencias numéricas están indicadas en diferente tipografía: cifras romanas, para los museos y colecciones; redondas, para los números de registro de las diferentes colecciones; negritas, para las especies minerales; y cursivas, para las localidades. Entrando por cualquiera de las tres listas se encuentran las correspondientes referencias que permiten hallar con facilidad cualquier dato que se busque. Dado el carácter del presente trabajo y del precedente sobre parecido tema,<sup>5</sup> son de prever nuevas aportaciones en ambos sentidos.

No podemos terminar esta breve introducción sin antes dejar constancia de nuestro agradecimiento a cuantos, con su desinteresada colaboración, han hecho posible la realización del presente trabajo: al Prof. D. Alfredo San Miguel, Director del Museo Municipal de Geología de Barcelona; a D. Juan Farel Domingo, Director del Museo de la Ciudad de Sabadell; a D. José Sirera, Director del Instituto Nacional masculino de Bachillerato de Lérida; y a los propietarios de las colecciones particulares citadas, D. Joaquín Folch Girona, D. José Closas Redonnet, D. José Cervelló Bach, D. Ramón Brumós Albero, D. Juan Andrés Rovira y D. José Munñé Purqueras.

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1. ALVAREZ-PÉREZ, A. y MONTORIOL-POUS, J. (1972). Nota referente a la bibliografía sobre los sulfuros metálicos de Cataluña. *Acta Geológica Hispánica*, VII, 6, 187-192.

A. — ÍNDICE DE MUSEOS Y COLECCIONES

- (I) COLECCIÓN ANDRÉS (Sabadell)
- Argentita [4 ejs. SN] (130)
  - Calcopirita [39 ejs. SN] (130)
  - Calcosina [11 ejs. SN] (130)
  - Covellina [35 ejs. SN] (130)
  - Esfalerita [42 ejs. SN] (130)
  - Galena [60 ejs. SN] (130)
  - Pirargirita [2 ejs. SN] (130)
  - Pirita [20 ejs. SN] (130)
- (II) COLECCIÓN BRUMÓS (Terrassa)
- Bornita [468] (66), [20] (140)
  - Calcopirita [137] (120), 14 (130)
  - Calcosina [137] (120)
  - Cobres grises [365] (120)
  - Covellina [18] (130)
  - Esfalerita [511] (24), [147] (98), [436, 483] (130)
  - Estibina [7, 356] (120)
  - Galena [144] (24), [355, 459] (79), [208] (98), [9, 11] (130)
  - Linneita [258] (24)
  - Marcasita [209] (24), [393] (98)
  - Maucherita [390] (180)
  - Millerita [140, 258] (24)
  - Mispiquel [15, 141] (116)
  - Molibdenita [461] (104), 691 (130)
  - Pirita [554] (79), [136] (87), [208] (98), [21, 22] (130)
  - Pirrotina [128] (65)
- (III) COLECCIÓN CERVELLÓ (Barcelona)
- Argentita [572] (180)
  - Bornita [848] (66)
  - Calcopirita [1651] (79), [737, 750, 1700] (130), [5789] (178)
  - Esfalerita [5648] (98), [5787, SN] (178)
  - Galena [866, 1633, 3926] (24), [871, 1731, 4873] (79), [1250] (110), [5788, SN] (178)
  - Gersdorffita [1678] (180)
  - Hessita [1677] (180)
  - Linneita [838, 839] (24)
  - Marcasita [860, 864, 892] (24), [5648] (98), [4458] (130)
  - Maucherita [836, 1678, 1679] (180)
  - Millerita [824, 826, 837, 841, 1752, 3937, 3938] (24), [836, 1677] (180)
  - Molibdenita [5791] (65), [548, 1701, 3860] (104)
  - Niquelina [3649] (7), [1677, 1699] (180)
  - Pearceita [1699] (180)
  - Pirita [1001, 1002, 1003, 1004, 1005, 1681, 1682, 1715] (87), [1650, 4458] (130), [1652, 1760, 1775] (170)
- (IV) COLECCIÓN CLOSAS (Barcelona)
- Argentita [2358] (59), [2212, 3580] (180)
  - Bornita [2295] (66), [432] (82)
  - Calcopirita [2359] (7), [2217] (13), [128] (25), [1627] (42), [120] (47), [3586] (59), [146] (97), [344] (123), [2360, 3584] (140), [968] (158), [2215] (166)
  - Chloantita [2214] (180)
  - Cobres grises [1550] (19), [689] (82), [2197] (107), [1119] (120), [2215] (166)
  - Covellina [3148] (130)
  - Esfalerita [2356] (5), [3531] (24), [3534] (28), [1399, 2294] (37), [1633] (82), [149] (83), [3533] (90), [3530] (98), [2060] (113), [1812] (143), [161, 2211] (180)
- (V) COLECCIÓN DEL DEPARTAMENTO DE CRISTALOGRAFÍA Y MINERALOGÍA DE LA UNIVERSIDAD DE BARCELONA
- Bornita [SN] (66)
  - Calcopirita [2.6.3.1.20] (9), [SN] (14), [SN] (28), [SN] (37), [SN] (42), [SN] (47), [SN] (61), [SN] (66), [SN] (68), [SN] (83), [SN] (91), [2.6.3.1.15] (98), [2.6.3.1.16] (102), [SN] (107), [SN] (116), [2.6.3.1.18] (120), [SN] (130), [SN] (131), [SN] (140), [SN] (145), [SN] (151), [SN] (158), [2.6.3.1.6] (161), [2.6.3.1.9, SN] (179)
  - Cobres grises [SN] (66), [3.2.4.1.5] (123)
  - Covellina [SN] (130)
  - Chloantita [3.1.1.2.1] (56)
  - Esfalerita [SN] (14), [SN] (28), [SN] (37), [SN] (47), [SN] (90), [SN] (98), [2.6.2.1.10] (120), [SN] (130), [2.6.2.1.4, 2.6.2.1.6, 2.6.2.1.2, SN] (143), [2.6.2.1.8] (146)
  - Estibina [SN] (106), [SN] (116)
  - Galena [SN] (5), [2.6.1.1.30, 2.6.1.1.32, 2.6.1.1.45, 2.6.1.1.50, 2.6.1.1.51] (9), [2.6.1.1.34] (10), [SN] (14), [2.6.1.1.34] (17), [2.6.1.1.44] (18), [SN] (28), [SN] (37), [SN] (47), [2.6.1.1.23, 2.6.1.1.47, SN] (59), [SN] (60), [SN] (82), [SN] (88), [SN] (90), [SN] (98) [2.6.1.1.39, 2.6.1.1.40] (104), [2.6.1.1.26] (107), [2.6.1.1.46] (110), [SN] (116), [2.6.1.1.36, 2.6.1.1.38] (130), [SN] (135), [2.6.1.1.24, SN] (143), [SN] (146), [2.6.1.1.44] (178).
  - Marcasita [SN] (94), [SN] (98), [SN] (130), [SN] (152)
  - Mispiquel [2.9.5.1.3] (108), [2.9.5.1.9, SN] (116), [2.9.5.1.1] (120), [SN] (130), [2.9.5.1.7, 2.9.5.1.8] (154)
  - Molibdenita [SN] (65), [2.9.6.1.3] (104)
  - Niquelina [2.6.5.3.3, 3.1.1.2.1] (56)
  - Pearceita [3.1.1.2.1] (56)
  - Pirita [SN] (7), [SN] (14), [2.9.1.1.8] (19), [SN] (24), [SN] (28), [SN] (37), [SN] (42), [SN] (60), [SN] (65), [SN] (71), [SN] (75), [SN]

(76), [2.9.1.1.3] (77), [SN] (83), [2.9.1.1.9, SN] (87), [2.9.1.1.13] (90), [SN] (94), [SN] (98), [SN] (100), [2.9.1.1.18, 2.9.1.1.25, SN] (104), [SN] (106), [SN] (116), [SN] (120), [SN] (121), [SN] (126), [2.9.1.1.5] (130), [2.9.1.1.10] (133), [SN] (140), [SN] (143), [2.9.1.1.14, SN] (147), [SN] (151), [SN] (152), [SN] (158), [SN] (159), [SN] (161), [SN] (170), [SN] (173), [SN] (180)  
 Pirrotina [SN] (14), [SN] (28), [SN] (37), [SN] (42), [SN] (65), [SN] (71), [2.6.5.1.12] (86), [SN] (98), [SN] (106), [SN] (131), [SN] (151), [SN] (158)  
 Zinquerita [3.8.8.1] (120)

(VI) COLECCIÓN FOLCH (Barcelona)

Argentita [368, 373, 379, 525, 526, 833, 1789, 1790, SN] (59), [377, 378, 557] (180)  
 Bornita [334] (66), [339] (82)  
 Calcopirita [303, 544, 773, 1265] (24)  
 Cobres grises [361, 419] (97)  
 Covellina [790] (130)  
 Esfalerita [344] (24), [2373, SN] (59), [580] (143), [580, 620] (180)  
 Galena [612] (10), [740] (13), [764, 773, 6572, 7576, 7593] (24), [600, 765, 768, 11682] (79), [SN] (82), [9893] (98), [770] (128), [SN] (143), [620] (180)  
 Gersdorffita [851] (13), [852] (59), [362, 485, 580, 847, 1275] (180)  
 Hessita [379] (59), [433, 434] (180)  
 Marcasita [6535, 6544, 7576, 7593] (24), [SN] (82), [9893] (98)  
 Maucherita [737, 740] (13), [379, 734, 735, 755] (59), [362, 377, 378, 433, 434, 485, 537, 557, 580, 847, SN] (180)  
 Millerita [531, 536, 544, 773, 786, 1265] (24), [537] (180)  
 Mispiquel [910] (116)  
 Molibdenita [921] (33), [924, 931, SN] (104)  
 Pearceíta [379] (59), [433, 434, 557] (180)  
 Pirargirita [1286, SN] (59)  
 Pirita [865] (56), [584] (87), [387] ((104), [SN] (117), [7328] (170)  
 Siegenita [303, 531, 536, 544, 773, 939, 1265] (24)

(VII) COLECCIÓN DEL INSTITUTO NACIONAL MASCULINO DE BACHILLERATO (Lérida)

Calcopirita [SN] (47), [SN] (108), [SN] (162)  
 Cobres grises [SN] (162)  
 Esfalerita [SN] (28), [SN] (37), [SN] (47)  
 Galena [SN] (47), [SN] (108), [SN] (151)  
 Mispiquel [SN] (162)  
 Pirita [SN] (47)

(VIII) COLECCIÓN MONNÉ (Sabadell)

Calcopirita [270, 421, 429, 430] (130)  
 Covellina [100, 101, 270] (130)  
 Galena [2, 5, 77, 101, 386] (130)  
 Pirita [283] (130)

(IX) MUSEO DE LA CIUDAD DE SABADELL

Calcopirita [M96] (60), [B58, B84, B87, B88, B91, B92, B93, B95, B96, B97, B98, B99, B100, B101, B102, B104, B105, B112, B119, B120, B123, B127, B128, B129, B130, B141, B145, B156, B184] (130), [E153] (140)  
 Cobaltina [E74] (180)  
 Cobres grises [E84] (82)

Covellina [B89, B107, B108, B109, B110, B111, B129, B145, B151, B214] (130)  
 Esfalerita [E145] (98), [B3, B34, B35, B36, B38, B39, B40, B41, B42, B43, B44, B45, B46, B47, B48, B49, B50, B51, B52, B53, B54, B55, B150, B185, B230] (130)  
 Estibina [M68] (95)  
 Galena [E77] (5), [E152] (24), [F78] (59), [M69] (60), [E151] (98), [B7, B8, B9, B10, B12, B13, B14, B15, B16, B17, B18, B19, B20, B22, B23, B24, B25, B26, B32, B33, B58, B73, B133, B138, B163, B170, B177, B185, B214, B225, B236] (130), [M77] (135), [E81] (149)  
 Mispiquel [E150] (116), [E75] (120)  
 Pirita [M14] (33), [E72] (34), [M92] (83), [E145] (87), [B61, B62, B63, B64, B65, B66, B67, B68, B69, B70, B71, B72] (130), [E73] (149)

(X) MUSEO MUNICIPAL DE GEOLOGÍA DE BARCELONA

Calcopirita [5653, 5683, 6853] (3), [5681] (6), [5651, 5710] (10), [3819] (13), [3960] (16), [5690] (25), [6846] (32), [3963] (36), [9158], (37), [5662] (38), [4564] (43), [3966] (44), [3968] (47), [3967] (48), [3971, 3972, 6836, 6851] (50), [5703] (54), [6856] (63), [3979, 5649, 5663, 6843, 6854] (66), [4008, 4009, 4010] (68), [3975] (74), [5650] (78), [3233] (81), [6842, 9375] (83), [5678] (89), [5672] (91), [5698] (92), [3977] (96), [3813, 3978, 6858] (98), [3980, 3981, 3982, 3983, 3984, 3985, 5647] (101), [6860] (102), [5645, 6864] (107), [3961, 5673] (110), [3986] (114), [6841] (116), [5687] (119), [3987, 3988, 3990, 5691, 5695, 9720] (120), [5664] (124), [6837, 6845] (130), [2793, 3234, 3235, 5629, 5635] (136), [5277] (137), [3993, 3994, 3995, 3996, 3999, 4002, 4003, 4004, 5638] (140), [5670] (142), [6844] (143), [5652] (144), [5671] (145), [5640] (150), [5684] (154), [379] (155), [5702] (157), [2995] (160), [2792, 5674, 6839, 6840, 6847, 6855] (161), [4005] (163), [64, 503, 5637, 5654] (166), [5644, 5685] (171), [4007] (175), [4011] (176), [5692] (179)  
 Calcosina [5687] (119)  
 Cobaltina [3819] (13)  
 Cobres grises [5703] (54), [3980] (101), [5695] (120), [SN] (123)  
 Esfalerita [2739, 2740, 3837] (5), [590] (7), [5194, 5202] (10), [6523, 6524, 6531] (14), [3191, 6503] (27), [6518, 6519, 6520, 6530] (28), [6521, 9891, 9893] (37), [5206, 5210, 5473, 6529] (67), [6517] (82), [5200] (85), [6504, 6509, 6512] (90), [5203] (92), [3776, 6505] (98), [2738, 3772] (111), [5411] (119), [2744, 4580, 5193] (120), [6510] (127), [6493, 9799] (130), [5211] (140), [3186, 3773, 3774, 3775, 3887, 6498, 6506, 6514, 6522, 6672] (143), [6813] (176), [6527] (178), [3783] (180)  
 Estibina [3752, 3754] (1), [54, 2732] (36), [3750, 3751] (51), [5172] (53), [3760, 3761, 6487] (106), [5182, 6472] (107), [5184, 9717] (116), [2733, 3756, 3757, 3758, 3759, 3760, 3761, 5174, 6484] (120), [5180] (129), [1642] (147)  
 Galena [3835] (2), [3841] (4), [2782, 3836, 3837] (5), [5549] (6), [590, 6655] (7), [396] (8), [6623] (9), [369, 2788, 2789, 3839, 3840, 4646, 5391, 5394, 5396, 5415, 5432, 5438, 5493, 5495, 5501, 5512, 5513, 5515, 5561] (10), [5462] (11), [3819] (13), [5770] (15), [5483] (19), [3844, 3845, 3846, 5480, 5532] (20), [3847, 3848] (21), [3842, 3843, 6645] (23), [1270, 2785, 3202, 3203,

- 3207, 3849, 3851, 3853, 3854, 3855, 3856, 5423, 5524, 6244, 6629, 6677, 6680, 8825, 9172] (24), [3859] (26), [3864] (29), [552] (35), [3860] (36), [6673] (45), [3896] (47), [3862] (50), [6625] (52), [5447] (54), [370, 5461] (56), [3866] (57), [2784, 3867, 5474, 5559, 6621, 6626, 6678] (59), [5571] (62), [4650] (64), [6624] (65), [5410, 5453, 5522] (66), [5473, 6679] (67), [3895] (68), [5537] (70), [5442] (71), [5569, 5565] (73), [2780, 2781, 3206, 9796, 9798, 9800] (79), [3869] (80), [3872] (82), [6658] (83), [2786] (85), [5427, 5436, 5558] (89), [3873, 5400, 5420, 5523, 5550, 6619, 6700] (90), [5422] (92), [5499] (95), [62, 371, 3874, 3875, 3877, 3878, 3879, 3880, 6620, 6638, 6639] (98), [2777, 6661, 6669] (104), [5488] (105), [3882] (106), [6633] (108), [5300] (109), [5475, 5540] (111), [5514, 5566] (112), [5489, 6627] (114), [3861] (116), [5491, 5520, 5557] (118), [5411] (119), [6664] (122), [2779, 3201, 3881, 5443, 5487, 5492, 6663, 6674, 6706] (130), [2790, 3884] (134), [2778] (135), [5425, 5428, 5434] (139), [3885] (140), [3773, 3887, 5437, 5444, 6636, 6672] (143), [3888, 3889, 5546, 6654] (146), [5433, 5482, 5497] (149), [2787] (150), [5507] (153), [5527] (155), [3890, 3891, 3892] (156), [5503, 5504] (168), [3893, 3894, 5554, 6643, 6656, 9886] (173), [5494] (174), [3899, 4542, 6650, 6565] (178), [5518] (180)
- Marcasita [2763, 3823, 3824, 3856, 3858, 6680] (24), [10103] (98)
- Millerita [3819] (13)
- Mispuquel [6243] (108), [395, 6812] (116), [6242] (154)
- Molibdenita [3764, 6488] (36), [2735, 5191, 5933] (132)
- Pirita [5320] (1), [5283] (5), [5532, 6759] (7), [362] (8), [5202] (10), [5255] (11), [5227] (12), [5225, 5265, 6571] (19), [5251] (22), [3199, 3853, 5238] (23), [5690] (24), [3187] (30), [5290] (31), [2759, 2769, 3860, 5247, 5299, 9714] (36), [3792, 5294] (39), [3794] (40), [5241] (41), [6776] (46), [5713] (49), [365, 5286] (52), [2755] (55), [2752] (56), [361] (58), [6558] (59), [6549] (61), [8184] (62), [5206] (67), [9882] (69), [9730] (72), [5307] (75), [2754, 5650] (78), [5256, 5259, 9795, 9796, 9797] (79), [3803] (82), [6566] (83), [60, 2748, 2749, 2750, 3198, 3804, 5224, 5229, 5285, 5338, 5341, 6777, 6779] (87), [6561] (90), [2760] (93), [3807, 6574] (98), [5253] (99), [5326, 5336] (101), [6582] (104), [5337] (108), [5300] (109), [5309] (112), [2751] (114), [5325] (115), [3793, 6812] (116), [5687] (119), [5193, 5352] (120), [6664] (122), [2758] (125), [9895] (126), [6578] (130), [2761] (132), [6573] (133), [5263] (136), [5277, 3810] (137), [2767, 2768] (138), [3811, 3812] (140), [5281, 5348] (141), [3196] (143), [3197] (147), [6579] (148), [3800] (149), [5291] (161), [5280] (167), [5349, 5503] (168), [3806] (169), [4428, 10232] (170), [5222, 5327, 5359] (171), [5297, 5305] (172), [3818, 5239] (173), [3631] (177), [4633, 5232] (180)
- Pirrotina [2745, 10039] (65)
- Tennantita [5703] (54)
- (2) Bismutina ( $S_8 Bi_2$ ), (2.8.2.2); (NR)
- (3) Bornita ( $S_4 Fe Cu_8$ ), (2.4.3); (II, 66, 140), (III, 66), (IV, 66, 82), (V, 66), (VI, 66, 82)
- (4) Bourronita ( $S_8 Sb Cu Pb$ ), (3.5.1.1); (NR)
- (5) Calcopirita ( $S_2 Fe Cu$ ), (2.6.3.1); (I, 130), (II, 120, 130), (III, 79, 130, 178), (IV, 7, 13, 25, 42, 47, 59, 97, 123, 140, 158, 166, (V, 9, 14, 28, 37, 42, 47, 61, 66, 68, 83, 91, 98, 102, 107, 116, 120, 130, 131, 140, 145, 151, 159, 161, 179), (VI, 24), (VII, 47, 108, 162), (VIII, 130), (IX, 60, 130, 140), (X, 3, 6, 10, 13, 16, 25, 32, 36, 37, 38, 43, 44, 47, 48, 50, 54, 63, 66, 68, 74, 78, 81, 83, 89, 91, 92, 96, 98, 101, 102, 107, 110, 114, 116, 119, 120, 124, 130, 136, 137, 140, 142, 143, 144, 145, 150, 154, 155, 157, 160, 161, 163, 166, 171, 175, 176, 179)
- (6) Calcosina (S Cu), (2.3.2.1); (I, 130), (II, 120), (X 119)
- (7) Cobaltina (S As Co), (2.9.2.1); (IX, 180), (X, 13)
- (8) Cobres grises ( $S_8$ ) ( $Sb, As, Bi$ )<sub>2</sub> ( $Cu_2 Ag_2 Fe Zn Hg$ )<sub>8</sub>, (3.2.4); (II, 120), (IV, 19, 82, 107, 120, 166), (V, 66, 123), (VI, 97), (VII, 162), (IX, 82), (X, 54, 101, 120, 123)
- (9) Covellina (S Cu), (2.6.8.1); (I, 130), (II, 130), (IV, 130), (V, 130), (VI, 130), (VIII, 130), (IX, 130)
- (10) Cubanita ( $S_8 Fe_2 Cu$ ), (2.6.6.1); (NR)
- (11) Chloantita ( $As_{2-x} Ni$ ), (2.10.14); (IV, 180), (V, 56)
- (12) Discrasita ( $Sb Ag_3$ ), (2.2.1); (NR)
- (13) Escuterudita (Co, Ni)  $As_{2-x}$ , (2.10.11); (NR)
- (14) Esfalerita (S Zn), 2.6.2.1; (I, 130), (II, 24, 98, 130), (III, 98, 178), (IV, 5, 24, 28, 37, 82, 83, 90, 98, 113, 143, 180), (V, 14, 28, 37, 47, 90, 98, 120, 130, 143, 146), (VI, 24, 59, 143, 180), (VII, 28, 37, 47), (IX, 98, 130), (X, 5, 7, 10, 14, 27, 28, 37, 67, 82, 85, 90, 92, 98, 111, 119, 120, 127, 130, 140, 143, 176, 178, 180)
- (15) Esmaltina ( $As_{2-x} Co$ ), (2.10.12); (IV, 13)
- (16) Estefanita ( $S_8 Sb Ag_8$ ), (3.1.4); (NR)
- (17) Estibina (S Sb), (2.8.2.1); (II, 120), (IV, 107, 116, 129, 135), (V, 106, 116), (IX, 95), (X, 1, 36, 51, 53, 106, 107, 116, 120, 129, 147)
- (18) Galena (S Pb), (2.6.1.1); (I, 130), (II, 24, 79, 98, 130), (III, 24, 79, 110, 178), (IV, 10, 13, 24, 37, 47, 59, 67, 79, 83, 90, 98, 103, 104, 111, 116, 130, 135, 158, 161, 167, 173), (V, 5, 9, 10, 14, 17, 18, 28, 37, 47, 59, 60, 82, 88, 90, 98, 104, 107, 110, 116, 130, 135, 143, 146, 178), (VI, 10, 13, 24, 79, 82, 98, 128, 143, 180), (VII, 47, 108, 151), (VIII, 130), (IX, 5, 24, 59, 60, 98, 130, 135, 149), (X, 2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 19, 20, 21, 23, 24, 26, 29, 35, 36, 45, 47, 50, 52, 54, 56, 57, 59, 62, 64, 65, 66, 67, 68, 70, 71, 73, 79, 80, 82, 83, 85, 89, 90, 92, 95, 98, 104, 105, 106, 108, 109, 111, 112, 114, 116, 118, 119, 130, 134, 135, 139, 140, 143, 146, 149, 150, 153, 155, 156, 168, 173, 174, 178, 180)
- (19) Gersdorffita (S As Ni), (2.9.2.3); (III, 180), (IV, 24), (VI, 13, 59, 180)
- (20) Hessita ( $Ag_2 Te$ ), (2.3.1.8); (III, 180), (IV, 180), (VI, 59, 180)
- (21) Iodargirita (I Ag), (9.1.4); (NR)
- (22) Jamesonita ( $Pb_2 Fe Sb_2 S_{11}$ ), (3.6.7); (NR)
- (23) Linneita (Ni, Co, Fe S)<sub>2</sub> (Ni, Co), (2.7.1.1); (II, 24), (III, 24), (IV, 24)
- (24) Loellingita ( $Fe As_2$ ), (2.3.3.1); (IV, 130)
- (25) Marcasita ( $S_8 Fe$ ), (2.9.4); (II, 24, 98), (III, 24, 98, 130), (IV, 13, 24, 180), (V, 94, 98, 130, 152), (VI, 24, 82, 98), (X, 24, 98)
- (26) Maucherita ( $Ni_{11} As_8$ ), (2.4.1); (II, 180), (III, 180), (IV, 24, 180), (VI, 13, 59, 180)

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- (1) Argentita (S Ag), (2.3.1.1); (I, 130), (III, 180), (IV, 59, 180), (VI, 59, 180)

- (27) Millerita (S Ni), (26.5.5); (II, 24), (III, 24, 180), (IV, 24, 180), (VI, 24, 180), (X, 13)
- (28) Mispiquel (S As Fe), (2.9.5.1); (II, 116), (IV, 116, 130, 165), (V, 108, 116, 120, 130, 154), (VI, 116), (VII, 162), (IX, 116, 120), (X, 108, 116, 154)
- (29) Molibdenita (S<sub>2</sub> Mo), (2.9.6.1); (II, 104, 130), (III, 65, 104), (IV, 99, 104, 161), (V, 65, 104), (VI, 33, 104), (X, 36, 132)
- (30) Niquelina (As Ni), (2.6.5.3); (III, 7, 180), (IV, 5, 13, 180), (V, 56)
- (31) Pearceita (Ag, Cu)<sub>10</sub> As<sub>2</sub> S<sub>11</sub>, (3.1.1.2); (III, 180), (IV, 180), (V, 56), (VI, 59, 180)
- (32) Pirargirita (S<sub>8</sub> Sb Ag<sub>3</sub>), (3.2.1.1); (I, 130), (VI, 59)
- (33) Pirita (S<sub>2</sub> Fe), (2.9.1.1); (I, 130), (II, 79, 87, 98, 130), (III, 87, 130, 170), (IV, 24, 83, 87, 108, 116, 164, 170), (V, 7, 14, 19, 24, 28, 37, 42, 60, 65, 71, 75, 76, 77, 83, 87, 90, 94, 98, 100, 104, 106, 116, 120, 121, 126, 130, 133, 140, 143, 147, 151, 152, 158, 159, 161, 170, 173, 180), (VI, 56, 87, 104, 117, 170), (VII, 47), (VIII, 130), (IX, 33, 34, 83, 87, 130, 149), (X, 1, 5, 7, 8, 10, 11, 12, 19, 22, 23, 24, 30, 31, 36, 39, 40, 41, 46, 49, 52, 55, 56, 58, 59, 61, 62, 67, 69, 72, 75, 78, 79, 82, 83, 87, 90, 93, 98, 99, 101, 104, 108, 109, 112, 114, 115, 116, 119, 120, 122, 125, 126, 130, 132, 133, 136, 137, 138, 140, 141, 143, 147, 148, 149, 161, 167, 168, 169, 170, 171, 172, 173, 177, 180)
- (34) Pirrotina (S Fe), (2.6.5.1); (II, 65), (IV, 13, 37, 131, 143, 158), (V, 14, 28, 37, 42, 65, 71, 86, 98, 106, 131, 151, 158), (X, 65)
- (35) Plagionita (S<sub>17</sub> Sb<sub>5</sub> Pb<sub>3</sub>), (3.7.4.2); (IV, 84)
- (36) Polibasita (S<sub>11</sub> Sb<sub>2</sub>) (Ag, Cu)<sub>16</sub>, (3.1.1.1); (NR)
- (37) Polidimita (Ni<sub>3</sub> S<sub>4</sub>), (2.7.1.5); (IV, 24)
- (38) Proustita (S<sub>8</sub> Ag<sub>3</sub> As), (3.2.1.2); (NR)
- (39) Querargirita (Cl Ag), (9.1.1.4); (NR)
- (40) Rathita (S<sub>40</sub> As<sub>38</sub> Pb<sub>18</sub>), (3.6.8); (NR)
- (41) Siegenita (Co, Ni)<sub>3</sub> S<sub>4</sub>, (2.7.1.2); (VI, 24)
- (42) Tennantita (S<sub>12</sub> As<sub>4</sub> Cu<sub>12</sub>), (3.2.4.2); (V, 54)
- (43) Ullmanita (S Sb Ni), (2.9.2.3); (NR)
- (44) Zinquenita (S<sub>4</sub> Sb<sub>2</sub> Pb), (3.8.8); (IV, 120), (V, 120)
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- (79) Martorell (5, III), (18, II, III, IV, VI, X), (33, II, X)
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