

Table 2. Deposit classification scheme.

[ACT, Australian Capital Territory; Ag, silver; Al, aluminum; Ala., Alabama; Ariz., Arizona; As, arsenic; Au, gold; AUS, Australia; AZE, Azerbaijan; B, boron; BC, British Columbia; Be, beryllium; BHT, Broken Hill type; Bi, bismuth; BOL, Bolivia; BRA, Brazil; Ca, calcium; Calif., California; CAN, Canada; CD, elastic-dominated; CHL, Chile; CHN, China; Co, cobalt; CO₂, carbon dioxide; COD, Democratic Republic of the Congo; Colo., Colorado; Cr, chromium; CRI, Costa Rica; Cu, copper; CUB, Cuba; DEU, Germany; EEZ, Exclusive Economic Zone; ESP, Spain; EU, European Union; Fe, iron; FIJ, Fiji; FIN, Finland; Fm., Formation; GBR, United Kingdom of Great Britain and Northern Ireland; HFSE, high field strength elements; Hg, mercury; HS, high sulfidation; H₂S, hydrogen sulfide; Ill., Illinois; IND, India; IOA, iron oxide-apatite; IOCG, iron oxide-copper-gold; IRE, Ireland; IS, intermediate sulfidation; ISCG, iron sulfide-copper-gold; ITA, Italy; JPN, Japan; K, potassium; Ky., Kentucky; LCT, lithium-cesium-tantalum; Li, lithium; LIP, large igneous province; LS, low sulfidation; MB, Manitoba; MEX, Mexico; Mg, magnesium; Mich., Michigan; Minn., Minnesota; Mn, manganese; MNG, Mongolia; Mo, molybdenum; Mo., Missouri; Mont., Montana; MRT, Mauritania; MT, magnetotelluric; MVT, Mississippi Valley type; Na, sodium; NA, not applicable; Nb, niobium; NB, New Brunswick; N. Dak., North Dakota; Nev., Nevada; NGA, Nigeria; Ni, nickel; N.J., New Jersey; NL, Newfoundland and Labrador; N. Mex., New Mexico; NS, Nova Scotia; NSW, New South Wales; NT, Northern Territory in AUS and Northwest Territories in CAN; NU, Nunavut; N.Y., New York; NYF, niobium-yttrium-fluorine; Okla., Oklahoma; ON, Ontario; Oreg., Oregon; Pb, lead; PER, Peru; PGE, platinum group elements; PHL, Philippines; PNG, Papua New Guinea; QC, Quebec; QLD, Queensland; REE, rare earth elements; RUS, Russia; SA, South Australia; SAU, Saudi Arabia; SCLM, subcontinental lithospheric mantle; S. Dak., South Dakota; SEDEX, sedimentary exhalative; SK, Saskatchewan; SMS, seafloor massive sulfide; Sn, tin; So. Am., South America, SWE, Sweden; Ta, tantalum; TAS, Tasmania; Te, tellurium; Tenn., Tennessee; Tex., Texas; Th, thorium; Ti, titanium; TUR, Turkey; U, uranium; UKR, Ukraine; U-M, ultramafic and (or) mafic; U.S., United States; V, vanadium; VAMS, volcanic-associated massive sulfide; VEN, Venezuela; VMS, volcanogenic massive sulfide; VHMS, volcanic-hosted massive sulfide; VIC, Victoria; W, tungsten; WA, Western Australia; Wash., Washington; W. Va., West Virginia; Wis., Wisconsin; Wyo., Wyoming; YT, Yukon Territory; ZAF, South Africa; Zn, zinc; ZWE, Zimbabwe]

Genetically related features	Deposit environment	Deposit group	Deposit type	Synonym(s)	Example(s)	Reference(s)
Chemical weathering, erosion of soft material, and concentration of resistate minerals in situ, preexisting mineralization	Erosional	Placer	Residual placer tin	Lag tin	AUS: Renison Bell; BRA: Pitinga	Morland, 1990; Alves and others, 2018
Chemical weathering, erosion of soft material, and concentration of resistate minerals in situ, preexisting mineralization	Erosional	Placer	Residual placer lead	Lag lead	MEX: Santa Eulalia; U.S.: Upper Mississippi Valley Pb, Wis. and Ill.	Megaw, 2009
Exhumation, topographic relief, drainage network, preexisting mineralization	Erosional	Placer	Fluvial placer gold	Alluvial gold	AUS: Victorian goldfields, VIC; CAN: Atlin, BC; Carriboo, BC; Klondike, YT; U.S.: American River Au, Calif.	Yeend, 1986
Exhumation, topographic relief, drainage network, preexisting mineralization	Erosional	Placer	Fluvial placer PGE	Alluvial PGE	U.S.: Goodnews Bay PGE-Au, Alaska	Yeend and Page, 1986
Exhumation, topographic relief, drainage network, preexisting mineralization	Erosional	Placer	Fluvial placer tin	Alluvial tin	AUS: Pilbara, WA; North Queensland, QLD; U.S.: Seward Peninsula Sn, Alaska	Reed, 1986a
Exhumation, topographic relief, drainage network, preexisting mineralization	Erosional	Placer	Fluvial placer niobium-tantalum	Alluvial niobium-tantalum	NGR: Jos Plateau	Pastor and Turaki, 1985
Exhumation, topographic relief, drainage network, preexisting mineralization	Erosional	Placer	Fluvial placer tungsten	Alluvial tungsten	CAN: Boulder Creek, BC; U.S.: Alder Creek, Alaska	Bundtzen, 1986
Exhumation, topographic relief, drainage network, specific rock types	Erosional	Placer	Fluvial placer REE	Alluvial REE	AUS: Charleys Creek, NT; U.S.: Idaho, Carolina Piedmont	Sengupta and Van Gosen, 2016
Exhumation, topographic relief, drainage network, kimberlite pipe	Erosional	Placer	Fluvial placer diamond	Alluvial diamond	AUS: Upper Smoke Creek (from Argyle diamond pipe), WA; Namibia: Orange River	Cox, 1986b
Exhumation, topographic relief, drainage network, specific rock type	Erosional	Placer	Fluvial placer gemstones	Alluvial gemstones	AUS: Anakie, QLD; Glen Innes, NSW; US: Yogo, Mont.	Clabaugh, 1952
Exhumation, topographic relief, drainage network, specific rock type	Erosional	Placer	Fluvial placer garnet	Alluvial garnet	AUS: Harts Range garnet, NT; U.S.: Emerald Creek, Idaho	Evans and Moyle, 2006
Exhumation, topographic relief, drainage network, delta, shoreline, barrier island, specific rock types	Erosional	Placer	Heavy mineral sands	Mineral sands	AUS: Keysbrook, WA; WIM150, VIC; Jacinth, SA; U.S.: Boise REE-Th-Ti-Nb-Ta, Idaho	Levson, 1995; Van Gosen and others, 2014
Exhumation, topographic relief, drainage network, delta, shoreline, barrier island, preexisting mineralization	Erosional	Placer	Shoreline placer gold	Beach placer gold	CAN: Graham Island, BC; Queen Charlotte Islands, BC; County Harbour, NS; U.S.: Nome Au, Alaska	Bundtzen and others, 1994
Exhumation, topographic relief, drainage network, delta, shoreline, barrier island, specific rock types	Erosional	Placer	Paleoplacer heavy mineral sands	Lithified mineral sands; indurated mineral sands	CAN: Elliot Lake-Blind River, ON; U.S.: Sanostee Mesa Ti, N. Mex.	Van Gosen and others, 2014
Exhumation, topographic relief, drainage network, delta, shoreline, barrier island, specific rock types	Erosional	Placer	Paleoplacer tin	NA	AUS: Kikoiira-Gibearvale, NSW	Campbell and others, 2003; Burton and Downes, 2005
Exhumation, topographic relief, drainage network, delta, shoreline, barrier island, preexisting mineralization	Erosional	Placer	Paleoplacer gold ± uranium	Quartz pebble conglomerate Au-U	CAN: Elliot Lake-Blind River, ON; Mulvehill, BC.; U.S.: Cambrian Deadwood Fm., S. Dak.; ZAF: Witwatersrand	Cox, 1986e; Roscoe, 1995; Taylor and Anderson, 2018
Stable area with low relief, tropical climate, Al-bearing rock types, unsaturated zone, water table	Supergene	Laterite	Bauxite	Lateritic bauxite	AUS: Weipa, QLD; BRA: Pocos de Caldas district; CAN: Florence, BC; U.S: Arkansas bauxite	Gordon and others, 1958; Bárdossy and Aleva, 1990
Stable area with low relief, tropical climate, Al-bearing rock types above carbonate rocks, unsaturated zone, water table	Supergene	Laterite	Karst bauxite	Carbonate bauxite	EU: Mediterranean bauxite belt; CHN: Yunnan deposits	Bárdossy, 1982; Hou and others, 2017

Stable area with low relief, tropical climate, ultramafic rocks, unsaturated zone, water table	Supergene	Laterite	Laterite nickel	Nickel-cobalt laterite: Lateritic nickel	AUS: Murrin Ni laterite, WA; U.S.: Puerto Rico Ni laterite	Berger and others, 2011; Marsh and others, 2013
Stable area with low relief, tropical climate, carbonatites, unsaturated zone, water table	Supergene	Laterite	Carbonatite laterite REE	NA	AUS: Mt. Weld, WA	Cocker, 2014; Verplanck and others, 2016
Stable area with low relief, tropical climate, carbonatites, unsaturated zone, water table	Supergene	Laterite	Laterite magnesite	NA	AUS: Thuddungra, NSW	Diemar, 1998
Variable climate, unsaturated zone, Al-bearing rock types, water table	Supergene	Clay	Residual clay	Secondary clay	AUS: Pittong, VIC; Scottsdale, TAS; CAN: Lang Bay, BC; Sumas Mountain, BC; Buse Lake, BC; Saint Remi, QC; U.S.: Secondary clay Minn.	Hosterman, 1998
Variable climate, unsaturated zone, Al- or REE-bearing shales adjacent to coal seams, water table	Supergene	Clay	Underlay, overlay	Gob	CAN: Quinsam Mine, BC; CHN: Chongqing, Daqinshan, Lincang, Yishan; MNG: Jungar; U.S.: Coal underlay Ill.-Ky.-W. Va.	Seredin and Finkelman, 2008; Zhao and others, 2019; Yang and others, 2020
Variable climate, unsaturated zone, Al- or REE-bearing granitic, peralkaline, or carbonatite rocks, water table	Supergene	Clay	Ion adsorption REE	NA	CAN: Grande-Vallée, QC; CHN: Jiangxi, Guangdong, Fujiang, Guangxi; U.S.: Piedmont ion adsorption REE	Foley and Ayuso, 2015; Sanematsu and Watanabe, 2016
Variable climate, unsaturated zone, preexisting Ag-rich mineralization, water table	Supergene	Supergene	Supergene silver	NA	AUS: Wonawinta, NSW; CAN: Murray Brook, NB; MEX: Sierra Mojada	Skirka, 2005; Sillitoe, 2009; Ahn, 2010
Variable climate, unsaturated zone, preexisting Pb-rich mineralization, water table	Supergene	Supergene	Supergene lead	NA	AUS: Magellan, WA	McQuitty and Pascoe, 1998; Pirajno and others, 2010
Variable climate, unsaturated zone, preexisting U-rich mineralization, water table	Supergene	Supergene	Supergene uranium	NA	AUS: Angela, NT	Lally and Bajwah, 2006; Bolonin and Gradovsky, 2012; Edgoose, 2013
Variable climate, unsaturated zone, preexisting V-rich mineralization, water table	Supergene	Supergene	Supergene vanadium	NA	NAM: Otavi Mountainland	Schwellnus, 1945; Verwoerd, 1957; Boni and others, 2007
Variable climate, unsaturated zone, preexisting Au-rich mineralization, water table	Supergene	Supergene	Supergene gold	Regolith gold	CAN: Murray Brook, NB	Rennick and Burton, 1992
Variable climate, unsaturated zone, preexisting Zn-rich mineralization, water table	Supergene	Supergene	Supergene zinc	Non-sulfide Zn, oxidized Zn (Pb)	AUS: Magellan, WA; CAN: Redbird, Lomond, Reeves MacDonald, Caviar, HB, Oxide, Cariboo Zinc, Flipper Creek, Dolomite Flats, Main, Gunn and Que, BC; U.S.: Leadville, Colo.; Balmat, N.Y.	Boni and Mondillo 2015; Paradis and others, 2015
Variable climate, unsaturated zone, preexisting Cu-rich mineralization, water table	Supergene	Supergene	Supergene copper	NA	CAN: Afton, BC; Windy Craggy, BC; U.S.: Santa Rita (Chino) Cu, N. Mex.; Morenci, Ariz.	Titley and Marozas, 1995
Variable climate, unsaturated zone, preexisting Mn-rich mineralization, water table	Supergene	Supergene	Supergene manganese	NA	AUS: Woodie Woodie, WA	Jones, 2017
Variable climate, unsaturated zone, preexisting Fe-rich mineralization, water table	Supergene	Supergene	Supergene iron	NA	AUS: Hamersley iron province, WA; CAN: Labrador Trough, NL and QC; U.S.: Lake Superior, Minn.-Mich.-Wis.	Leith, 1931
Infiltration of surface water, aquifers, preexisting Cu mineralization, redox interface	Infiltrational	Exotic	Exotic copper	Paleochannel copper	MEX: El Pilar	Münchmeyer, 1998
Infiltration of surface water, fluvial paleochannels, preexisting Fe, Mn mineralization, redox interface	Infiltrational	Paleochannel	Paleochannel iron	Ferriretes, manganocretes	AUS: Hamersley iron province, WA; U.S.: New World, Mont.	Ramanaidou and others, 2003
Infiltration of surface water, aquifers, preexisting volcanic ash-bearing sedimentary rocks, redox interface	Infiltrational	Uranium	Sandstone uranium	Roll front, and others	AUS: Angela, NT; U.S.: Colorado Plateau, Utah-Colo.	Lally and Bajwah, 2006; Edgoose, 2013; Breit, 2016; IAEA, 2020
Infiltration of surface water, aquifers, preexisting volcanic ash-bearing sedimentary rocks, redox interface	Infiltrational	Uranium	Carbonate uranium	NA	U.S.: Grants, N. Mex.	IAEA, 2020
Infiltration of surface water, aquifers, preexisting volcanic ash-bearing sedimentary rocks, redox interface	Infiltrational	Uranium	Coal/peat/bog uranium	NA	U.S.: Williston Basin, Mont.-N. Dak.-S. Dak.	IAEA, 2020
Infiltration of surface water, aquifers, preexisting volcanic ash-bearing sedimentary rocks, lacustrine evaporite	Infiltrational	Uranium	Calcrete uranium	Surficial uranium, evaporite uranium	AUS: Yeelirrie, WA; U.S.: Southern High Plains, N. Mex., Okla., Tex.	Hall and others, 2019; IAEA, 2020
Infiltration of CO ₂ -bearing surface water into fractured ultramafic rocks	Infiltrational	Magnesite	Nodular magnesite	Cryptocrystalline magnesite	AUS: Kunwarara, QLD; CAN: Mount Brussilof, BC; U.S.: Red Mtn., Calif.	Page, 1998b; Simandl and Hancock, 1999

Silled marine basin, arid climate, pinnacle reefs, evaporites, sabkha dolomites	Basin evaporative	Evaporite	Marine evaporite gypsum	NA		CAN: Windsor, NS; Elkhorn, BC; U.S.: Oklahoma	Raup, 1991a; Warren, 2010
Silled marine basin, arid climate, pinnacle reefs, evaporites, sabkha dolomites	Basin evaporative	Evaporite	Marine evaporite salt	NA		CAN: Goderich, ON; Grosseille, QC; U.S.: Gulf Coast, Tex.	Raup, 1991b; Warren, 2010
Silled marine basin, arid climate, pinnacle reefs, evaporites, sabkha dolomites	Basin evaporative	Evaporite	Marine evaporite potash	NA		CAN: Elk Point Basin, SK; U.S.: Carlsbad, N. Mex.	Williams-Stroud, 1991; Warren, 2010
Silled marine basin, arid climate, pinnacle reefs, evaporites, sabkha dolomites	Basin evaporative	Evaporite	Marine evaporite magnesite	Sedimentary magnesite		AUS: Witchelina and Mount Hutton, SA	Horn and others, 2017
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite trona	NA		U.S.: Green River, Wyo.	Dyni, 1991; Warren, 2010
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite salt	NA		U.S.: Bonneville, Utah	Orris, 1992; Warren, 2010
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite potash	NA		EU: Rhine graben	Warren, 2010
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite carnallite-bischofite	NA		CAN: Wynyard, SK; EU: Rhine graben	Warren, 2010
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite borate	NA		U.S.: Rio Tinto (U.S. Borax), Calif.	Orris, 1995; Warren, 2010
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite magnesite	Sedimentary magnesite		U.S.: Needles, Calif.	Vitaliano, 1950
Closed lacustrine drainage basin, arid climate, sea spray, salt flats	Basin evaporative	Evaporite	Lacustrine evaporite nitrate	NA		So. Am.: Central Andes	Williams-Stroud, 1991; Warren, 2010
Silled marine basin, arid climate, pinnacle reefs, evaporites, sabkha dolomites	Basin evaporative	Brine	Marine brine potash (\pm Mg, Li, and so on)	NA		U.S.: Kane Creek potash, Utah; Michigan Basin potash, Mich.	Warren, 2010
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Brine	Lacustrine brine potash	NA		AUS: Lake Wells, WA; U.S.: Searles Lake, Calif.	Orris, 2011
Closed lacustrine drainage basin, arid climate, salt flats	Basin evaporative	Brine	Lacustrine brine lithium	NA		CAN: Swan Hill, AB; CHL: Atacama; U.S.: Clayton Valley, Nev.	Bradley and others, 2013; Munk and others, 2016
Closed lacustrine drainage basin, arid climate, salt flats, volcanic rocks	Basin evaporative	Zeolite	Lacustrine zeolite (\pm Li, B)	NA		U.S.: Rhyolite Ridge, Nev.	Sheppard, 1991; Ioneer, 2020
Closed lacustrine drainage basin, arid climate, salt flats, ash and clay layers	Basin evaporative	Clay	Lacustrine clay lithium	NA		U.S.: McDermitt, Nev.	Asher-Bolinder, 1991; Castor and Henry, 2020
Marine chemoclines, anoxic or euxinic lows, bioproductivity, seawater	Basin chemical	Black shale	Black shale vanadium \pm Mo \pm Ni	Metalliferous black shale, stone coal, carbonaceous marl		AUS: Julia Creek, QLD; CAN: Tar Sands, AB; U.S.: Gibellini V, Nev.; Phosphoria Fm. V, Mont.-Idaho-Wyo.	Granitto and others, 2017
Marine chemoclines, anoxic or euxinic lows, bioproductivity, seawater	Basin chemical	Black shale	Black shale nickel \pm Mo-PGE	Metalliferous black shale		CAN: Nick Ni-Mo-PGE, YT	Hulbert and others, 1992; Lefebure and Coveney, 1995; Gadd and others, 2020
Marine chemoclines, anoxic or euxinic lows, bioproductivity, seawater	Basin chemical	Black shale	Black shale gold	NA		U.S.: Upper Rodeo Au, Nev.	Emsbo, 2000
Marine chemoclines, anoxic or euxinic lows, bioproductivity, seawater	Basin chemical	Black shale	Black shale uranium	NA		U.S.: Chattanooga U, Tenn.	IAEA, 2020
Marine chemoclines, ocean currents bioproductivity, wave base, seawater	Basin chemical	Phosphorite	Phosphorite	Phosphate		AUS: Ammaroo, NT; D-Tree, QLD; Phosphate Hill/ Duchess, QLD; CAN: Athabasca Basin, SK; U.S.: Phosphoria Fm., Mont.-Idaho-Wyo.	Emsbo and others, 2016a
Atmospheric oxidation, oceanic oxidation event, seawater	Basin chemical	Iron formation	Superior-type banded iron formation	Lake Superior		AUS: Hamersley iron province, WA; CAN: Labrador Trough, NL and QC; U.S.: Mesabi, Minn.	Cannon, 1986b
Oceanic anoxic events, marine chemoclines, ocean currents, wave base, seawater	Basin chemical	Iron formation	Oolitic iron formation	Ironstone, Clinton-type, Minette-type		AUS: Train Range, QLD; CAN: Clear Hills, AB, Bell Island, NL; U.S.: Clinton, N.Y.	Maynard and Van Houten, 1992
Regional-scale and intense Fe-Na-(Ca \pm K) metasomatism and magnetic/gravity anomalies, caldera lakes	Basin chemical	Iron formation	Lacustrine iron formation	NA		U.S.: Upper Pilot Knob, Mo.	Nold and others, 2014
Atmospheric oxidation, oceanic oxidation event, seawater	Basin chemical	Manganese	Superior-type banded manganese	Mamatwan-type; gondite		CAN: Woodstock, NB; ZAF: Kalahari	Caimcross and Beukes, 2013
Oceanic anoxic events, marine chemoclines, ocean currents, wave base, seawater	Basin chemical	Manganese	Sedimentary manganese	Shelf sequence manganese, Nikopol-type manganese		AUS: Groote Eylandt and Bootu Creek, NT; UKR: Chiatura, Nikopol-Tokmak; U.S.: Cuyuna Range, Minn.; Aroostock County, Maine	Force and others, 1999; Cannon and others, 2017; Harvey and others, 2017

Marine chemoclines, ocean currents, atolls and plateaus, seawater	Basin chemical	Manganese	Crust manganese	Ferromanganese crusts	U.S. EEZ: Blake Plateau	Bau and others, 2014; Mizell and Hein, 2016
Marine chemoclines, ocean currents, abyssal plains, seawater	Basin chemical	Manganese	Nodule manganese	Ferromanganese nodules	U.S. EEZ: near Johnson Island, Hawaii	Hein and Koschinsky, 2014
Closed lacustrine drainage basin, redox interface	Basin chemical	Manganese	Lacustrine manganese	NA	U.S.: Artillery Mountains Mn, Ariz.	Long and others, 1992
Unconformity, epicontinental basin fill, arid climate, evaporites, basin brine, extensional faults, alkali and magnesium metasomatism	Basin hydrothermal	Unconformity-related	Unconformity-related uranium	NA	AUS: Jabiluka, NT; Ranger, NT; Coronation Hill, NT; CAN: McArthur River, SK; Cigar Lake, SK; Rabbit lake, SK; Key Lake, SK	Skirrow and others, 2009
Unconformity, epicontinental basin fill, arid climate, evaporites, basin brine, extensional faults, alkali and magnesium metasomatism	Basin hydrothermal	Unconformity-related	Unconformity-related REE	NA	AUS: Browns Range, WA; CAN: Maw zone, SK	Nazari-Dehkordi and others, 2018
Collapse breccia, epicontinental basin fill, arid climate, evaporites, basin brine, extensional faults, alkali and magnesium metasomatism	Basin hydrothermal	Collapse breccia pipe	Collapse breccia pipe uranium	NA	U.S.: Grand Canyon, Ariz.	Alpine, 2010; Van Gosen and others, 2016; IAEA, 2020
Continental rift basin, initial phase, volcanics, conglomerates, and siliciclastics, arid climate, evaporites, basin brine, growth faults, salt tectonics, alkali and magnesium metasomatism	Basin hydrothermal	Volcanic-hosted	Volcanic-hosted copper	Volcanic-red bed copper; basaltic copper	CAN: Sustut, BC and Copper River, YT; U.S.: Calumet-Hecla and Kearsarge Mich.	Cox, 1986a; Lefebure and Church, 1996
Continental rift basin, initial phase, volcanics, conglomerates and siliciclastics, arid climate, evaporites, basin brine, growth faults, salt tectonics, alkali and magnesium metasomatism	Basin hydrothermal	Sediment-hosted	Sediment-hosted copper ± Co	Sediment-hosted Cu-Ag-Co, shale-hosted Cu, Kupferschiefer-type, redbed Cu	AUS: Nifty, WA; CAN: Redstone, NT; COD: copper belt; DEU: Kupferschiefer district U.S.: White Pine, Mich.; Rock Creek and Montanore, Mont.	Hayes and others, 2015
Continental rift basin, fill phase, turbidite sequences, arid climate, evaporites, growth faults, mafic magmatism, basinal brine, alkali and magnesium metasomatism, seafloor vents	Basin hydrothermal	Sediment-hosted	Siliciclastic-mafic zinc-lead	Metamorphosed SEDEX, CD, Sullivan-type, Broken Hill-type (BHT)	AUS: Broken Hill, NSW; Cannington, QLD; CAN: Sullivan and Kechika Trough, BC; MacMillan Pass, YT	Lydon and others, 2000; Spry and Teale, 2021
Continental rift basin, fill phase, turbidite sequences, arid climate, evaporites, growth faults, mafic magmatism, basinal brine, alkali and magnesium metasomatism, seafloor vents	Basin hydrothermal	Sediment-hosted	Siliciclastic-mafic barite	NA	U.S.: Northumberland barite, Nev.	Clark and Orris, 1991
Continental rift (or passive margin) basin, sag phase, carbonate shelf and silici-clastic slope sequences, arid climate, evaporites, growth faults, basin brine, alkali and magnesium metasomatism, seafloor vents	Basin hydrothermal	Sediment-hosted	Siliciclastic-carbonate zinc-lead	Sedex, CD, McArthur, bedded	AUS: Mt. Isa, QLD; McArthur River, NT; CAN: Howard's Pass, YT; U.S.: Red Dog Zn, Alaska; Balmat-Edwards Zn-Pb, N.Y.	Emsbo, 2009; Emsbo and others, 2016b
Continental rift (or passive margin) basin, sag phase, carbonate shelf and silici-clastic slope sequences, arid climate, evaporites, growth faults, basin brine, alkali and magnesium metasomatism, seafloor vents	Basin hydrothermal	Sediment-hosted	Irish-type sediment-hosted zinc-lead	NA	IRE: Irish zinc belt (Navan, Lisheen, Tynagh, Silvermines, Galmoy, Ballinalack)	Hitzman, 1995; Höy, 1996
Continental rift basin, initial phase, conglomerates and siliciclastics, arid climate, evaporites, basin brine, growth faults, salt tectonics, alkali and magnesium metasomatism	Basin hydrothermal	Sediment-hosted	Kipushi-type sediment-hosted copper-zinc-lead	Kipushi, salt dome	U.S.: Ruby Creek, Alaska; Apex, Utah	Cox and Bernstein, 1986; De Magnee and Francois, 1988
Contractional orogeny, foreland basin, forebulge faults, arid climate, evaporites, basin brine, alkali and magnesium metasomatism	Basin hydrothermal	Mississippi Valley-type (MVT)	MVT zinc-lead	NA	AUS: Lennard Shelf, WA; Admiral Bay, WA; CAN: Polaris and Nanisivik, NU; Pine Point, NT; Robb Lake, BC; Gays River, NS; U.S.: Viburnum trend, Mo.	Leach and others, 2010
Contractional orogeny, foreland basin, forebulge faults, arid climate, evaporites, basin brine, alkali and magnesium metasomatism	Basin hydrothermal	Mississippi Valley-type (MVT)	MVT barite	NA	CAN: Walton, NS; U.S.: SE Missouri barite district	Leach and others, 2010
Contractional orogeny, foreland basin, forebulge faults, arid climate, evaporites, basin brine, alkali and magnesium metasomatism	Basin hydrothermal	Mississippi Valley-type (MVT)	MVT fluorspar	NA	CAN: Liard, BC; U.S.: Illinois-Kentucky fluorspar	Plumlee and others, 1995; Denny and others, 2015, 2016; Hayes and others, 2017

Contractional orogeny, foreland basin, forebulge faults, arid climate, evaporites, basin brine, alkali and magnesium metasomatism	Basin hydrothermal	Mississippi Valley-type (MVT)	MVT strontium	NA		TUR: Sivas basin celestite	Ucurum and others, 2017
Contractional orogeny, foreland basin, forebulge faults, arid climate, evaporites, basin brine, alkali and magnesium metasomatism	Basin hydrothermal	Mississippi Valley-type (MVT)	Sandstone-hosted zinc-lead	NA		CAN: Wigwam, BC; George Lake, SK; SWE: Laisvall Zn-Pb	Briskey, 1986
More oxidized and (or) meta-morphosed equivalents of features noted in the previous row	Basin hydrothermal	Non-sulfide	Non-sulfide zinc-lead ± Mn	Oxide zinc		AUS: Beltana, SA; BRA: Vazante; U.S.: Franklin-Sterling Hill, N.J.	Hitzman and others, 2003
Crystalline basement, extensional faults, basin brine, natural gas, redox interface, hydro-lytic ± CO ₂ metasomatism, arsenides, regional iron and alkali-calcic metasomatism	Basin hydrothermal	Five-element	Vein five-element	Ag-Bi-Co-Ni arsenide		CAN: Beaver and Timiskaming, ON; Cobalt, ON; Silver Islet, ON; Echo Bay and Eldorado, NT; U.S.: Wickenburg, Ariz.; Black Hawk, N Mex.	Kissin, 1992; Mumin and others, 2010; Markl and others, 2016; Burisch and others, 2017; Scharrer and others, 2019; Corriveau and others, in press
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , H ₂ S metasomatism	Metamorphic hydrothermal	Orogenic	Hypozonal orogenic gold	Mesothermal gold; low-sulfide gold-quartz-vein, shear zone gold		CAN: Borden Lake, ON	Groves and others, 1998; Goldfarb and others, 2005, 2016
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , H ₂ S metasomatism	Metamorphic hydrothermal	Orogenic	Mesozonal orogenic gold	Mesothermal gold; low-sulfide gold-quartz-vein, shear zone gold		AUS: Golden Mile, WA; Bendigo, VIC; CAN: Sigma, QC; Timmins and Detour Lake, ON; Bridge River, BC; U.S.: Mother Lode, Calif.; Alaska-Juneau, Alaska	Groves and others, 1998; Goldfarb and others, 2005, 2016
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , H ₂ S metasomatism	Metamorphic hydrothermal	Orogenic	Epizonal orogenic gold	Refractory orogenic gold, Carlini-style gold		AUS: Wiluna, WA; Fosterville, QLD; CAN: Raecla and Coffee, YT; CHN: Qiuling; U.S.: Donlin Creek, Alaska	Groves and others, 1998; Goldfarb and others, 2005, 2016
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , ± H ₂ S metasomatism	Metamorphic hydrothermal	Orogenic	Epizonal orogenic antimony ± gold	NA		AUS: Hillgrove, NSW; CAN: Bridge River-Bralorne, BC; U.S.: U.S. Antimony Mine, Mont.	Bliss and Orris, 1986; Groves and others, 1998; Goldfarb and others, 2005, 2016; Hofstra and others, 2013
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , ± H ₂ S metasomatism	Metamorphic hydrothermal	Orogenic	Epizonal orogenic mercury	NA		CAN: Pinchi Lake, BC; U.S.: Southwest, Alaska	Gray and Bailey, 2003
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , ± H ₂ S, ± alkali metasomatism	Metamorphic hydrothermal	Orogenic	Orogenic silver-lead-zinc-copper-antimony	NA		AUS: Endeavor (Elura), NSW; Woodcutters, NT; U.S.: Coeur d'Alene district, Idaho-Mont.	Leach and others, 1988, 1998; Beaudoin and Sangster, 1992, 1995
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, hydrolytic, CO ₂ , ± H ₂ S, alkali metasomatism	Metamorphic hydrothermal	Orogenic	Orogenic copper ± gold	NA		AUS: Cobar, NSW; Mt. Isa Cu, QLD	Lawrie and Hinman, 1998
Contractional orogen, metamorphic belts, dilatant structures, metamorphic fluid, carbon metasomatism	Metamorphic hydrothermal	Orogenic	Orogenic graphite	vein, lump graphite		CAN: Buckingham, QC; Lacdes-Îles, QC; Calumet, QC; Miller, QC; U.S.: Crystal Graphite, Mont.	Luque and others, 2014; Simandl and others, 2015
Regional metamorphic belts	Metamorphic	Metamorphic	Metamorphic graphite	Flake graphite, amorphous graphite		AUS: Campoona Shaft, SA; CAN: Lac Knife, QC; U.S.: Graphite Cr. Alaska; Alabama Graphite, Ala.	Luque and others, 2014; Simandl and others, 2015
Regional metamorphic belts	Metamorphic	Metamorphic	Metamorphic kyanite	NA		CAN: Crocan Lake, ON; U.S.: Dillwyn, Va.	Marr, 1992
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Alkali-calcic	Low Iron alkali-calcic	NA		AUS: Merlin Mo-Re, Mount Dore Cu-Ag-Au-Zn, Tick Hill Au, QLD; BRA: Alvo 118 Cu-Au	Xavier and others, 2012; Babo and others, 2017; Le, 2019
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Alkali-calcic	Albitite-hosted uranium	Albitite-type metasomatic U		AUS: Valhalla U, QLD; CAN: Michelin U, NL	Gandhi, 1978; Polito and others, 2009; Sparkes and others, 2017

Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Metasomatic iron	Ferroan carbonate polymetallic	NA	MRT: Guelb Moghrein Cu-Au	Kirschbaum and Hitzman, 2016
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Metasomatic iron	Iron sulfide poly-metallic	ISCG	AUS: Lorena Co-As-Bi-Au, Mount Cobalt Co-As, QLD; CAN: Delhi Pacific Cu-Ag- Au, QC; IND: Akwali Cu; U.S.: Iron Creek Co-Cu, Idaho	Sarkar and Dasgupta, 1980; McLaughlin and others, 2016; Ristorcelli and Schlitt, 2019
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Metasomatic iron	Iron silicate poly-metallic	NA	BRA: Sossego Cu-Au-Ag; CAN: Scadding Au, ON; FIN: Haveri Au; PER: Raul-Condestable Cu-Au-Ag; U.S.: Blackbird Co-Cu-Au, Idaho	Strauss, 2003; De Haller and others, 2006; Schandl and Gorton, 2007; Monteiro and others, 2008; Slack, 2013; Corriveau and others, in press
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Metasomatic iron	Iron oxide poly-metallic	NA	BRA: Jatoba Ni; CAN: NICO Au-Co-Bi-Cu, NT; U.S.: Iron Creek Co-Cu, Idaho	Slack, 2013; Acosta-Góngora and others, 2015; Montreuil and others, 2016; Ristorcelli and Schlitt, 2019; Veloso and others, 2020
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Metasomatic iron	Iron oxide uranium	NA	AUS: Mount Gee U, SA; CAN: Southern Breccia U, NT	Youles and Oilmin, 1986; Montreuil and others, 2015
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	Metasomatic iron	Iron oxide gold	NA	AUS: Prominent Hill Au, SA; White Devil Au-Cu-Bi, Noble Nob Au, Juna Au-Cu-Bi-Ag, NT; U.S.: Detachment Au, Calif.	Schandl and Gorton, 2007; Spencer and Duncan, 2015
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	IOCG	Hematite-dominant IOCG	NA	AUS: Olympic Dam Cu-Au-Ag-U; Prominent Hill Cu- Au; Carrapateena Cu-Au; Oak Dam West, SA; CHL: Mantoverde Cu-Au	Rieger and others, 2010; Skirrow, 2010; Ehrig and others, 2012; Oz Minerals, Ltd., 2013; Schlegel and Heinrich, 2015; King, 2019
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	IOCG	Magnetite-dominant IOCG	NA	AUS: Ernest Henry Cu-Au, QLD; BRA: Salobo Cu-Au-Ag; CAN: Sue Dianne, NT; CHL: Candelaria; CHN Dahongshan Fe-Cu-(Ag- Au); MRT: Guelb Morghein Cu-Co-Au; U.S.: Boss- Bixby Cu, Mo.; Yerington Cu, Nev.; Lights Creek Cu, Calif.	Barton and others, 2000; Marschik and Fontboté, 2001; Camier, 2002; Mark and others, 2006; Mumin and others, 2010; Kirschbaum and Hitzman, 2016; deMelo and others, 2017; Zhao and others, 2017
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	IOA	Hematite-dominant IOA	NA	AUS: Oak Dam Fe; U.S.: Iron Mtn., Mo.; Cortez Mtns., Nev.	Barton and others, 2000; Davidson and others, 2007
Continental arc or rift, mafic to felsic or alkalic magmatism, sedimentary basins, dilatant faults, magmatic and basinal or lacustrine brines, iron alkali calcic metasomatism, high amplitude magnetic, gravity, and MT anomalies	Regional metasomatic	IOA	Magnetite-dominant IOA	NA	AUS: Lightning Creek Fe, QLD; CAN: Josette Fe-REE, Marmoraton Fe, and Lac Marmorat Fe, QC; Mag Hill Fe-(REE-V) and Terra Fe-(REE), NT; CHL: El Laco Fe; CHN: Middle-Lower Yangtze Metallogenic Belt; PER: Marcona Fe; SWE: Kiirunavaara Fe; U.S.: Pea Ridge, Mo.; Mineville Fe-REE, N.Y.; Humboldt complex, Nev.	McKeown and Klemic, 1956; Leonard and Buddington, 1964; Hildebrand, 1986; Johnson and Barton, 2000; Perring and others, 2000; Edfelt and others, 2005; Clark and others, 2010; Mumin and others, 2011; Yu and others, 2011; Harlov and others, 2016; Tornos and others, in press; Zhao and others, in press

Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic massive sulfide (VMS)	Mafic-ultramafic VMS	Volcanic-hosted massive sulfide (VHMS), volcanic-associated massive sulfide (VAMS), seafloor massive sulfide (SMS), Cyprus-type	CAN: Betts Cove, York Harbour, and Tilt Cove, NL; Potterdoal, ON; Chu Chua, BC; Norway: Lokken; U.S.: Turner-Albright, Oreg.	Shanks and Thurston, 2012; Hannington, 2014; Monecke and others, 2016
Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic massive sulfide (VMS)	Mafic-siliciclastic VMS	Volcanic-hosted massive sulfide (VHMS), volcanic-associated massive sulfide (VAMS), seafloor massive sulfide (SMS), Besshi-type	AUS: Tritton, NSW; De-Grussa, WA; CAN: Windy Craggy, BC; Goldstream, BC; Standard, BC; True Blue, BC; JPN: Besshi; U.S.: Ducktown, Tenn.	Shanks and Thurston, 2012; Hannington, 2014; Monecke and others, 2016
Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic massive sulfide (VMS)	Bimodal-mafic VMS	Volcanic-hosted massive sulfide (VHMS), volcanic-associated massive sulfide (VAMS), seafloor massive sulfide (SMS), Noranda-type	AUS: Mount Lyell, TAS; Sulphur Springs, WA; CAN: Home, Quemont, and Noranda, QC; Kidd Creek, ON; Flin Flon, MB; Buchans, NL; Bathurst-Newcastle, NB; JPN: Kuroko; Spain: Rio Tinto; Sweden: Kristieberg; U.S.: Shasta King, Calif.; Lockwood, Wash.; Bald Mountain, Maine	Shanks and Thurston, 2012; Hannington, 2014; Monecke and others, 2016
Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic massive sulfide (VMS)	Bimodal felsic VMS	Volcanic-hosted massive sulfide (VHMS), volcanic-associated massive sulfide (VAMS), seafloor massive sulfide (SMS), Kuroko-type	AUS: Rosebery, Mount Read, TAS; Gossan Hill, WA; CAN: Myra Falls, BC; Eskay Creek, BC; Izok Lake, NU; CHN: Gacun; JPN: Hokuroku; U.S.: Jerome, Ariz.	Shanks and Thurston, 2012; Hannington, 2014; Monecke and others, 2016
Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic massive sulfide (VMS)	Felsic-siliciclastic VMS	Volcanic-hosted massive sulfide (VHMS), volcanic-associated massive sulfide (VAMS), seafloor massive sulfide (SMS), Bathurst-type, Iberian-type	CAN: Bathurst, NB; Brunswick No 12, NB; ESP: Iberian Pyrite Belt; U.S.: Bonfield, Alaska	Shanks and Thurston, 2012; Hannington, 2014; Monecke and others, 2016
Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic	Algoma-type banded iron formation	Volcanogenic iron formation	AUS: Koongie Park Formation, WA; BRA: Carajas; CAN: Mary River, NU; Helen Mine, ON; Sherman, ON; Adams, ON; Griffith, ON; Iron Hill, ON; Adam River, ON; Woodstock, NB; Austin Brook, NB; IND: Kudremuk; U.S.: Vermilion, Minn.; VEN: Cerro Bolivar	Cannon, 1986a
Oceanic rift or arc volcanism, ±fluid exsolution, dilatant faults, convecting seawater, seafloor vents	Volcanic basin hydrothermal	Volcanogenic	Volcanogenic manganese	Franciscan, Cuban, Olympic Peninsula, and Cyprus manganese	CRI: Nicoya; U.S.: Franciscan Complex, Calif.; Olympic Mtns., Wash.	Mosier and Page, 1988
Occurs in more than one system type	Magmatic hydrothermal	Epithermal	Low-sulfidation (LS) epithermal gold-silver	Adularia-sericite gold-silver; hot-spring gold-silver; epizonal intrusion-related gold	AUS: Pajingo, QLD; Cracow, QLD; CAN: Mallery Lake, NU; Bakers Mine, BC; Lawyers, BC; U.S.: Sleeper, Nev.	John, 2001; Simmons and others, 2005
Occurs in more than one system type	Magmatic hydrothermal	Epithermal	Intermediate-sulfidation (IS) epithermal silver-gold ± Zn, Pb, Cu, Sn, Mn	Adularia-sericite silver-gold	AUS: Lake Cowal, NSW; CAN: Silbak-Premier, BC; U.S.: Comstock and Tonopah, Nev.; Creede, Colo.	Sillitoe and Hedenquist, 2003; Simmons and others, 2005
Occurs in more than one system type	Magmatic hydrothermal	Epithermal	High-sulfidation (HS) epithermal silver-gold ± Cu	Quartz-alunite gold, enargite-gold	AUS: Mt. Carlton, QLD; U.S.: Goldfield, Nev.	Sillitoe and Hedenquist, 2003; Simmons and others, 2005
Arc or rift, alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Epithermal	Alkalic epithermal gold ± Ag	Au-Ag-Te veins	FIJ: Emperor; PNG: Porgera; U.S.: Cripple Creek, Colo.	Jensen and Barton, 2000; Kelley and Spry, 2016; Kelley and others, 2020
Occurs in more than one system type	Magmatic hydrothermal	Epithermal	Epithermal mercury	Hot spring Hg	U.S.: McDermitt, Nev.	Rytuba, 1986
Continental rift, hydrous bimodal magmatism, A-type volcano-plutonic center, magmatic fluid, meteoric water	Magmatic hydrothermal	Epithermal	Epithermal beryllium	Volcanogenic Be	U.S.: Spor Mtn., Utah	Barton and Young, 2002; Foley and others, 2012
Continental rift, hydrous bimodal magmatism, A-type volcano-plutonic center, magmatic fluid, meteoric water	Magmatic hydrothermal	Epithermal	Epithermal uranium	Volcanogenic U, volcanic-related U	AUS: Ben Lomond, QLD; CAN: Sagar, QC; U.S.: Marysvale, Utah; Anderson Mine, Ariz.	Nash, 2010; Andrews and Parker, 2017; IAEA, 2020
Occurs in more than one system type	Magmatic hydrothermal	Vein	Vein ± replacement nickel	Avebury-style Ni, ophiolite-hosted Ni, hydrothermal Ni	AUS: Avebury, TAS	Callaghan and others, 2017
Occurs in more than one system type	Magmatic hydrothermal	Vein	Vein cobalt ± Ni	Hydrothermal Ni-Co-As	MRT: Bou Azzer	Ahmed and others, 2009

Occurs in more than one system type	Magmatic hydrothermal	Vein	Vein copper	NA		AUS: Cayley, VIC; CAN: Temagami, ON; U.S.: Magma, Ariz.	Friehauf and Pareja, 1998
Continental back arc or hinter-land, S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Vein	Vein tin	Cornwall-type		CAN: Kalzas, YT; Mount Pleasant, NB; GBR: Cornwall	Reed, 1986e
Continental back arc or hinterland, S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Vein	Vein tungsten	NA		CAN: Burnt Hill, NB; PER: Pasto Bueno	Cox and Bagby, 1986
Continental back arc or hinterland, S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Vein	Vein tin polymetallic	Bolivian-type		AUS: Baal Gammon, QLD; BOL: Oruro	Togashi, 1986
Occurs in more than one system type	Magmatic hydrothermal	Vein	Vein fluorite	Fluorspar		AUS: Meentheena and Speewah, WA; U.S.: Western Kentucky	Anderson, 2019
Occurs in more than one system type	Magmatic hydrothermal	Vein	Vein polymetallic	NA		CAN: Hector-Calumet and Elsa, Mayo district, YT; Slocan-New Denver-Ainsworth district, BC	Cox, 1986d
Occurs in more than one system type	Magmatic hydrothermal	Breccia pipe	Breccia pipe copper	Igneous-hydrothermal breccia		CAN: Tribag, ON; Croxall, ON; CHL: El Teniente	Skewes and others, 2002; Stern and others, 2011
Continental back arc or hinterland, regional felsic magmatism of ilmenite to magnetite series, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Breccia pipe	Breccia pipe gold	Intrusion-related gold		AUS: Kidston, QLD; Mt. Leyshon, QLD	Baker and Andrew, 1991; Allan and others, 2011
Continental rift, hydrous bimodal magmatism, A-type volcano-plutonic center, magmatic fluid	Magmatic hydrothermal	Breccia pipe	Breccia pipe molybdenum	NA		U.S.: Cave Peak Mo, Tex.	Sharp, 1979
Arc or rift, alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Breccia pipe	Breccia pipe REE	NA		U.S.: Pea Ridge REE, Mo.	Nuelle and others, 1991
Slab rollback, arc migration, magmatic volatiles, extensional faults, reduced slope facies, meteoric water, CO ₂ , H ₂ S and hydrolytic metasomatism, jasperoids	Magmatic hydrothermal	Carlin-type	Carlin-type gold	Sediment-hosted disseminated gold, sediment-hosted micron gold		CAN: Rackla, YT; CHN: Golden triangle; U.S.: Carlin trend, Battle Mtn.-Eureka trend, Getchell trend, Nev.	Hofstra and Cline, 2000; Cline and others, 2005; Muntean, 2018
Occurs in more than one system type	Magmatic hydrothermal	Distal-disseminated	Distal-disseminated silver-gold	Carlin-like, Carlin-style		U.S.: Lone Tree Ag-Au, Nev.	Cox, 1992
Occurs in more than one system type	Magmatic hydrothermal	Replacement	Replacement polymetallic	NA		CAN: Midway, BC; Bluebell, BC; Sa Dena Hes, YT; MEX: Santa Eulalia, Naica, Fresnillo, Velardena, Providencia; U.S.: Leadville district, Colo.; East Tintic district, Utah; Eureka district, Nev.	Morris, 1986; Titley, 1997
Occurs in more than one system type	Magmatic hydrothermal	Replacement	Replacement gold-silver	Sulfide manto Au		CAN: Ketz River, YT; Mosquito Creek, BC	Abercrombie, 1990
Continental back arc or hinterland, S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Replacement	Replacement tin	NA		AUS: Renison, TAS; CAN: Mount Pleasant, NB	Reed, 1986c; Hammarstrom and others, 1995a
Occurs in more than one system type	Magmatic hydrothermal	Replacement	Replacement copper	NA		U.S.: Bisbee, Ariz.	Stegen and others, 2005
Occurs in more than one system type	Magmatic hydrothermal	Replacement	Replacement zinc-lead	NA		U.S.: Bingham Canyon, Tintic, Park City, Deer Trail, Utah; Pima, Ariz.	Beaty and others, 1986; Titley, 1997
Occurs in more than one system type	Magmatic hydrothermal	Replacement	Replacement manganese	NA		U.S.: Butte, Mont.; Leadville, Colo.	Mosier, 1986
Arc, magnetite series, calc-alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Replacement	Replacement magnesium	Crystalline magnesite		CAN: Mount Bussilof, BC; U.S.: Premier Magnesia (Gabbs), Nev.	Page, 1998a; Simandl and Hancock, 1999
Occurs in more than one system type	Magmatic hydrothermal	Replacement	Replacement fluorite	NA		U.S.: McCulloghs Butte, Nev.	Barton, 1982
Occurs in more than one system type	Magmatic hydrothermal	Skarn	Skarn iron	NA		AUS: Paddys River, ACT; AZE: Dashkesan; CAN: Tasu, Jessie, Merry Widow, Iron Crown, Iron Hill, Yellow Kid, and Prescott, BC; CHN: Jinshandian, Middle Lower-Yangtze River Metallogenic Belt; CUB: Daiquiri; ITA: San Leone; JPN: Shinyama; RUS: Magnitogorsk, Perschansk, Sheregesh, and Teya; U.S.: Santa Rita, N. Mex.; Cornwall Iron Springs, Utah; Eagle Mountain, Calif.	Cox, 1986c; Hammarstrom and others, 1995c; Meinert and others, 2005; Zeng and others, 2020

Occurs in more than one system type	Magmatic hydrothermal	Skarn	Skarn copper	NA		CAN: Craigmont, BC; Phoenix, BC; Old Sport, BC; Queen Victoria, BC; Mines Gaspé, QC; U.S.: Copper Canyon, Nev.; Carr Fork Cu, Utah	Cox and Theodore, 1986; Meinert and others, 2005
Occurs in more than one system type	Magmatic hydrothermal	Skarn	Skarn tungsten ± Mo	NA		AUS: Molyhil, NT; O'Calaghans, WA; CAN: Cantung, NT; MacTung, YT; Emerald Tungsten, Didgeer, Feeney, Invisibile, and Dimac, BC; RUS: Tyrnyaucz; U.S.: Pine Creek, Calif.; Tem Piute district, Nev.	Hammarstrom and others, 1995a; Meinert and others, 2005
Continental back arc or hinterland, S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Skarn	Skarn tin ± copper ± Mo	NA		CAN: Silver Diamond, BC; Atlin Magnetite, BC; Daybreak, BC; JC, YT; U.S.: Lost River, Alaska; Majuba Hill, Nev.	Reed and Cox, 1986; Meinert and others, 2005
Occurs in more than one system type	Magmatic hydrothermal	Skarn	Skarn gold ± copper ± tungsten	Intrusion-related gold		AUS: Red Dome, QLD; CAN: Banks Island, BC; Hedley, BC; Ketz River, Marn and Horn, YT; Nickel Plate, BC; French, BC; Canty, BC; Good Hope, BC; Quesnel River, BC; U.S.: Fortitude and McCoy, Nev.	Ewers and Sun, 1989; Sillitoe, 1991; Theodore and others, 1991; Hart and others, 2002; Meinert and others, 2005; Hart, 2007
Occurs in more than one system type	Magmatic hydrothermal	Skarn	Skarn zinc-lead-silver	NA		CAN: Piedmont, BC; Midway, BC; Contact, BC; Quartz Lake, YT; U.S.: Groundhog, N. Mex.	Hammarstrom and others, 1995b; Meinert and others, 2005
Occurs in more than one system type	Magmatic hydrothermal	Skarn	Skarn molybdenum	NA		CAN: Coxe, BC; Novelty, BC; U.S.: Little Boulder Creek, Idaho; Cannivan Gulch, Mont.	Ray, 1995; Meinert and others, 2005
Continental rift, hydrous bimodal magmatism, A-type volcano-plutonic center, magmatic fluid	Magmatic hydrothermal	Skarn	Skarn beryllium-fluorite	NA		U.S.: Iron Mtn., N. Mex.	Barton and Young, 2002; Meinert and others, 2005
Peralkaline volcano-plutonic center	Magmatic hydrothermal	Skarn	Skarn uranium-REE	NA		AUS: Mary Kathleen REE-U, QLD	Oliver and others, 1999; Meinert and others, 2005
Arc or rift, alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Porphyry	Porphyry copper ± gold	Alkaline porphyry copper		AUS: Cadia, NSW; Northparkes, NSW; CAN: Galore Creek, BC; Copper Mountain, BC; Afton-Ajax, BC	Seedorff and others, 2005; Sillitoe, 2010
Arc, magnetite series, calc-alkaline volcano-plutonic center, magmatic fluid, hydrothermal alkali and hydrolytic metasomatism	Magmatic hydrothermal	Porphyry	Porphyry copper-molybdenum	Calc-alkaline porphyry copper		CAN: Highland Valley, BC; Gibraltar, BC; Brenda, BC; Highmont, BC; U.S.: Butte, Mont.; Bingham Canyon, Utah	Seedorff and others, 2005; Sillitoe, 2010
Continental back arc or hinterland, felsic magmatism of ilmenite to magnetite series, calc-alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Porphyry	Porphyry gold ± copper	Intrusion-related gold		AUS: Mungana, QLD; CAN: Kerr, BC; U.S.: Palmetto, Nev.	Hollister, 1992; Nethery and Barr, 1998; Seedorff and others, 2005
Continental rift, hydrous bimodal magmatism, A-type volcano-plutonic center, magmatic fluid	Magmatic hydrothermal	Porphyry	Climax-type porphyry molybdenum	Alkali-feldspar rhyolite-granite porphyry molybdenum; high-fluorine porphyry molybdenum		AUS: Unicorn, VIC; U.S.: Climax and Henderson, Colo.	Seedorff and others, 2005; Ludington and Plumlee, 2009; Audétat and Li, 2017
Arc, magnetite series, calc-alkaline volcano-plutonic center, magmatic fluid, hydrothermal alkali and hydrolytic metasomatism	Magmatic hydrothermal	Porphyry	Low-fluorine porphyry molybdenum	Arc-related porphyry molybdenum; low-fluorine stockwork molybdenite		CAN: Endako, BC; MAX, BC; Boss Mountain, BC; U.S.: Pine Nut, Nev.; Thompson Creek, Idaho	Theodore, 1986; Sinclair, 1995a; Seedorff and others, 2005; Taylor and others, 2012
Continental arc, back arc, or hinterland, felsic magmatism of ilmenite series, calc-alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Porphyry	Porphyry tungsten	NA		CAN: Mount Pleasant, NB	Sinclair, 1995b; Seedorff and others, 2005
Continental back arc, or hinterland, felsic S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Porphyry	Porphyry tin	NA		CAN: Mount Pleasant, NB; U.S.: Majuba Hill, Nev.	Reed, 1986b; Sinclair, 1995c; Seedorff and others, 2005
Continental back arc or hinterland, felsic S-type volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Greisen	Greisen tin ±W-Mo	NA		AUS: Anchor, TAS; CAN: Kemptville, NS; RUS: Spokoinnskoye; SAU: Silsilah Sn	Reed, 1986d
Continental back arc or hinterland, felsic magmatism of ilmenite series, felsic calc-alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Greisen	Greisen tungsten-molybdenum ±Bi	NA		AUS: Wolfram Camp, QLD; CAN: Sisson, NB; Mount Pleasant, NB; KAZ: Akchatau; U.S.: Indian Springs, Nev.	Kotlyar and others, 1995

Continental rift, hydrous bimodal magmatism, A-type volcano-plutonic center, magmatic fluid	Magmatic hydrothermal	Greisen	Greisen beryllium ±Li	NA		U.S.: McCulloghs Butte, Nev.	Barton and Young, 2002
Continental back arc or hinter-land, regional felsic magmatism of ilmenite series, calc-alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Intrusion-related	Reduced intrusion-related gold	Plutonic-related gold: intrusion-centered gold; sheeted vein gold; shear-related gold veins		CAN: Tombstone, YT; U.S.: Fort Knox, Alaska; Bald Mountain, Nev.	Sillitoe, 1991; McCoy and others, 1997; Thompson and others, 1999; Hart and others, 2002; Hart, 2007; Nutt and Hofstra, 2007
Continental back arc or hinterland, regional felsic magmatism of ilmenite to magnetite series, calc-alkaline volcano-plutonic center, magmatic fluid, alkali and hydrolytic metasomatism	Magmatic hydrothermal	Intrusion-related	Oxidized intrusion-related gold	Plutonic-related gold; disseminated gold; plutonic gold; intrusion-related gold veins		AUS: Ravenswood, QLD; Timbarra, NSW; Dargues Reef, NSW; CAN: Côte, ON, Malartic, QB	Sillitoe, 1991; Mustard, 2001; Blevin, 2004; Helt and others, 2014
Anatexis or any felsic pluton	Magmatic	Pegmatite	Simple pegmatite	NA		CAN: Buckingham, QC	Černý and Ercit, 2005; Martin and De Vito, 2005; London, 2008, 2016
Continental back arc or hinterland, S-type plutonic center	Magmatic	Pegmatite	LCT pegmatite	NA		AUS: Greenbush, WA; Wodgina, WA; Pilgangoora, WA; CAN: Tanco, MB; US: King Lithia, So. Dak.	Černý and Ercit, 2005; Martin and De Vito, 2005; London, 2008, 2016
Continental rift, hydrous bimodal magmatism, A-type plutonic center	Magmatic	Pegmatite	NYF pegmatite	NA		CAN: Bancroft, ON; Little Nahanni, YT	Černý and Ercit, 2005; Martin and De Vito, 2005; London, 2008, 2016
Anatexis associated with high grade metamorphism	Magmatic	Pegmatite	Abyssal pegmatite REE	NA		CAN: Fraser Lakes, SK	London, 2008
SCLM partial melt, alkalic-peralkaline magmatic center, carbonatites	Magmatic	Carbonatite	Carbonatite REE	NA		AUS: Mt. Weld, WA; CAN: Wicheeda Lake, BC; Nisikkatch Lake, SK; Montviel, QC; Lac Shortt, QC; Saint Honoré, QC; China: Bayan'obo; U.S.: Mountain Pass, Calif.	Verplanck and others, 2014, 2016; Simandl and Paradis, 2018
SCLM partial melt, alkalic-peralkaline magmatic center, carbonatites	Magmatic	Carbonatite	Carbonatite niobium	NA		CAN: Eldor, QC; Niobec, QC; Aley, BC; Blue River, BC; St. Lawrence Columbian Mine, QC	Verplanck and others, 2014, 2016; Simandl and Paradis, 2018
SCLM partial melt, alkalic-peralkaline magmatic center and related pegmatites	Magmatic	Peralkaline igneous	Peralkaline igneous HFSE-REE	NA		AUS: Dubbo, NSW; CAN: Strange Lake, QC; Misery Lake, QC; Kipawa, QC; Thor Lake, NT	Dostal, 2016
Zoned alkalic plutonic center	Magmatic	Apatite-nepheline-titanite intrusion	Apatite-nepheline-titanite intrusion	Alkaline massif, nepheline-syenite-foyaite complex		RUS: Apatyty	Kalashnikov and others, 2016
Alkalic dike complex	Magmatic	Apatite intrusion	Apatite intrusion REE	Apatite vein		AUS: Nolans Bore, NT	Hussey and Dean, 2013; Huston and others, 2016a
SCLM partial melt, diatreme, kimberlite	Magmatic	Kimberlite	Kimberlite diamond	NA		AUS: Argyll, WA; CAN: Ekati, Gahcho Kue, Snap Lake, and Diavik, NT; Renard, QC; Victor, ON	Michalski and Modreski, 1991; Pell, 1999
Archean to early Proterozoic continental rift or plume, high degree mantle melts, green-stone belts, ultramafic-mafic volcanic center	Magmatic	Komatiite	Komatiite nickel-copper-PGE	Kambalda-type, raglan-type		AUS: Kambalda; CAN: Langmuir, ON; Alexo-Dundonald, ON; Raglan, QC; Thompson, MB; ZWE: Damba	Page, 1986b; Naldrett, 2004; Zientek and others, 2017
Continental rift or plume, high degree mantle melts, LIP, ultramafic-mafic layered intrusion	Magmatic	Ultramafic and (or) mafic-layered intrusion	U-M layered intrusion chromium	NA		AUS: Coobina, WA; CAN: Bird River, MB; Ring of Fire, ON; ZAF: Bushveld Complex	Schulte and others, 2012
Continental rift or plume, high degree mantle melts, LIP, ultramafic-mafic layered intrusion	Magmatic	Ultramafic and (or) mafic-layered intrusion	U-M layered intrusion nickel-copper-PGE	Contact-type		AUS: Savannah, WA; Radio Hill, WA; CAN: Muskox, NU; Crystal Lake, ON; U.S.: Maturi, Spruce Road, Minn.	Naldrett, 2004; Zientek and others, 2017
Continental rift or plume, high degree mantle melts, LIP, ultramafic-mafic layered intrusion	Magmatic	Ultramafic and (or) mafic-layered intrusion	U-M layered intrusion PGE	Reef-type and (or) brecciated		CAN: Lac des Îles, ON; Marathon, ON	Zientek and others, 2017
Continental rift or plume, high degree mantle melts, LIP, ultramafic-mafic layered intrusion	Magmatic	Ultramafic and (or) mafic-layered intrusion	U-M layered intrusion iron-titanium-vanadium	NA		AUS: Balla Balla, WA; CAN: Grader, QC; Lac Doré, QC; Iron-T, QC; Sept Îles, QC; La Blache, QC	Page, 1986a
Continental rift or plume, high degree mantle melts, LIP, ultramafic-mafic stock or pluton (maybe zoned)	Magmatic	Ultramafic and (or) mafic intrusion	U-M intrusion nickel-copper-PGE	NA		CAN: Lynn Lake, MB	Naldrett, 2004
Continental rift or plume, high degree mantle melts, LIP, ultramafic-mafic sills, dikes, chonoliths	Magmatic	Ultramafic and (or) mafic conduit	U-M conduit nickel-copper-PGE	Flood basalt Ni-Cu-PGE, ferropicrite Ni-Cu-PGE, picrite-tholeiite N-Cu-PGE		AUS: Nebo-Babel, Expo-Savannah; CHN: Kalatongke; RUS: Norilsk; US: Eagle, Mich.; Tamarack, Minn.	Naldrett, 2004; Barnes and others, 2016; Zientek and others, 2017

Obducted oceanic or back arc crust	Magmatic	Ophiolite	Ophiolite chromium	Podiform chromite	CAN: Thetford Mines QC, Castle Mountain Nickel, BC; Scottie Creek, BC; PHL: Acoje	Duke, 1995; Ash, 1996; Mosier and others, 2012
Obducted oceanic or back arc crust.	Magmatic	Ophiolite	Ophiolite nickel-copper-PGE	Picrite-tholeiite Ni-Cu-PGE	PHL: Acoje	Yumul, 2001; Naldrett, 2004; Zientek and others, 2017
Convergent margin, ultramafic-mafic magmatic center	Magmatic	Ultramafic and (or) mafic intrusion	Arc U-M intrusion titanium- vanadium	Alaskan-type, uralian-type	CAN: Lac Allard, QC	Page and Gray, 1986
Convergent margin, ultramafic-mafic magmatic center	Magmatic	Ultramafic and (or) mafic intrusion	Arc U-M intrusion nickel- copper-PGE	Alaskan-type, uralian-type, picrite-tholeiite Ni-Cu-PGE	CAN: Tulameen Complex, BC; Turnagain, BC	Page and Gray, 1986; Naldrett, 2004
Convergent margin, late extension, intermediate plutonic center	Magmatic	Anorthosite massif	Anorthosite massif titanium	Anorthosite pluton	CAN: Lac Doré, QC; Lac Tio, QC; Norway: Tellnes	Woodruff and others, 2013
Convergent margin, late extension, intermediate (\pm granitic) dikes, sills, chonoliths	Magmatic	Anorthosite conduit	Anorthosite conduit nickel-copper-PGE	Anorthosite-granite-troctolite Ni-Cu-PGE	CAN: Voiseys Bay, NL	Naldrett, 2004; Barnes and others, 2016
Meteorite impact, ultramafic-mafic magmatism	Magmatic	Ultramafic and (or) mafic intrusion	Impact U-M intrusion nickel-copper-PGE	Impact melt Ni-Cu-PGE	CAN: Sudbury, ON	Keays and Lightfoot, 2004; Naldrett, 2004
