

Mineral Deposit Classifications						
Grouped by Host Rock						
Rock Group	Host Rock	Principal Metals	Geological Environment	Principal Processes	Age	Comment
Intrusive Igneous	Ultramafic Intrusion (peridotite)	Cr, Ni, PGE, Cu	Continental rift; mantle plume	Sulfur contamination/oversaturation of magma	>2,000 Ma	"PGE Reefs, Magmatic Sulfide Deps., Layered Chromites"
	Mafic Intrusion (gabbro)	Cu, Ni, PGE, Ti, V	Continental rift; mantle plume	Sulfur contamination of magma (Cu,Ni,PGE) oxide crystallization (Ti,V)	Fe-Ti variable	"Magmatic Sulfide Deposits"
	Alkaline/Carbonatite Intrusion	Rare Metals, U, Th	Gaseous venting of mantle into stable crust	Low degrees of partial melting of mantle	<2,000 Ma	Occurs as small intrusions or veins in larger felsic intrusions
	Kimberlite Pipes	Diamond	Rapid venting of deep mantle into stable crust	???	variable	Very small, cylindrical intrusions
	Felsic Intrusions (granite)	Cu, Mo, Au, Sn, W	Roof zones of granite intrusions	Sulfur-rich hydrothermal fluids degassing from cooling granitic magma	<200 Ma	"Porphyry Cu Deposits"
	Felsic Intrusions (polymetallic veins)	U, Th, Au, Ag, rare metals, alkali metals	Roof zones and country rock adjacent to granite intrusions	Metal-rich hydrothermal fluids degassing from cooling granitic magma	<200 Ma	Commonly in pegmatite veins and dikes
	Carbonate Rocks adjacent to Felsic Intrusions	Cu, Pb, Zn	Limestone country rock adjacent to granite intrusions	Sulfur-rich hydrothermal fluids degassing from cooling granitic magma replacing limestone	<200 Ma	"Skarn Deposits"
Extrusive Igneous	Ultramafic Extrusive (komatiite)	Ni	Rift zone, mantle plume	Sulfur contamination of primitive lava flow	>2,000 Ma	
	Mafic Extrusive (basalt)	Cu, Fe, Mn	Rift zone, mantle plume	Low sulfur hydrothermal fluids (native Cu) or sulfur contamination of lava flow (Cu sulfide)	variable	Keweenaw Copper Deposits
	Mixed Extrusive (basalt - rhyolite)	Zn, Cu, Pb, Mn, Au	Mid-ocean ridges (black smokers)	Metal/sulfur-rich hydrothermal fluids venting into seawater	variable	"Volcanic Massive Sulfide (VMS) Deposits"
Sedimentary	Coarse Clastic Sed Rx (Cong)	Au, U	High energy depositional environment (stream, beach)	Placer deposits; for U, in an anoxic environment	U >1,800 Ma Au - Variable	"Paleo-placer Deposits"
	Fine Clastic Sediments (SS-Sh)	Zn, Cu, Pb, Mn, Au	Mod-low energy depositional environment (sed basin)	Metal/sulfur-rich hydrothermal fluids venting into submarine sedimentary basin	variable	"Sedimentary Exhalative (SedEx) Deposits"
	Carbonate Rocks (limestone/dolostone)	Zn, Pb	Epicontinental deposits	Metal/sulfur-rich hydrothermal fluids infiltrating and replacing carbonate rocks.		"Mississippi Valley-type Deposits"
	Iron Formation - w/ Clastic Sed Rock	Fe (Mn)	Precambrian shallow marine environments	Oxygenation of otherwise O-poor seawater by photosynthesizing organisms	>1,800 Ma	"Lake Superior-type Banded Iron Formation (BIF)"
	Iron Formation - Greenstone-hosted	Fe	Precambrian submarine deposits on flanks of volcanic islands	Venting of iron/silica-rich, sulfur-poor hydrothermal fluids onto the seafloor	>2,400 Ma	"Algoma-type Banded Iron Formation (BIF)"
	Evaporites	halite (NaCl), gypsum(CaSO ₄ *2H ₂ O)	Closed basins in arid environments (playa lakes)	Extreme evaporation leading to precipitation from saline waters	<1,800 Ma	Salt domes are mobilized halite deposits
	Nodule, Concretions, Crusts	Mn, P	Deep water sedimentary basins	precipitation from seawater by a variety of formational processes	<1,800 Ma	Old deposits not well preserved
	Coal Beds	C	Heavily forested lagoonal environments	Accumulation, compaction, and heating of plant material	<350 Ma	Land plants evolved the Late Devonian period
Petroleum and Natural Gas-bearing Clastic Sedimentary Rock	Hydrocarbons in liquid (crude oil) and gas (CH ₄) form	Micro-organism-rich, reducing sedimentary basins	Accumulation and heating of organic material to liquid and gas state; migration from source rock (oil shale) to reservoir rock (porous sandstone)	<500 Ma	most petroleum formed from accumulations of algae, bacteria, plankton, and foraminifera	
Meta-morphic	Quartz Veins	Au, Ag	Regional metamorphism in mountain belts	Metamorphism leading to dissolution of quartz and liberation of gold from various host rocks; reprecipitates elsewhere with cooling	variable	"Lode Gold Deposits"
Surficial	Laterite, Regolith, Paleosol	Al (bauxite), Ni (as Ni oxide)	Tropical climate	Intense chemical weathering of rocks at Earth's surface	Most <60 Ma	Ni-laterite forms from weathering of ultramafic rocks
	Placer Deposits	Au, Pt, Ti	Stream channels and beaches	Heavy metals concentrated in fast moving currents and wave-washed beaches	<25,000	Deposited since the last glaciation