



Copper-Nickel ores

Pentlandite ((Ni,Fe)S) is the most important nickel sulphide mineral and is often associated with nickel-containing pyrrhotite and chalcopyrite. Gangue minerals can include talc and other troublesome silicates which must be dispersed and/or depressed.

Recovery and separation entails floating all three sulphide minerals into a bulk flotation concentrate at natural pH or at elevated pH using soda ash. Strong flotation collectors are used, e.g. amyl xanthate and combination of dithiophosphates/mercaptobenzothiazole and xanthate, with or without prior activation of pyrrhotite with copper sulphate. Soda ash disperses talc and can provide gangue depression. Often CMC is used to depress talc.

In instances where the pyrrhotite is barren of metal values, copper sulphate is not needed and a more selective collector, such as a dithiophosphate, should be used with a small amount of xanthate as a secondary collector.

Some plants use bulk flotation in an acid pH environment which is achieved using SO₂ or H₂SO₄.

Separation of the bulk concentrate copper and nickel minerals is generally accomplished by flotation of the copper from pentlandite and nickel-bearing iron sulphides which report to the flotation tails. Pentlandite and iron sulphides are depressed by raising the pH up to 12 with lime and a small amount of sodium cyanide. Elevating the slurry temperature to 30-35 degrees C may improve the separation. Addition of depressants, such as starch or dextrin, may improve pentlandite depression.

In some cases, because pyrrhotite has paramagnetic properties, magnetic removal of pyrrhotite may be possible from the pentlandite concentrate produced.



The following Danafloat™ collectors should be initially considered for copper-nickel processing:

Danafloat™ 123
 Danafloat™ 233
 Danafloat™ 245
 Danafloat™ 271
 Danafloat™ 468
 Danafloat™ 871