

DESCRIPTIVE MODEL OF NORIL'SK Cu-Ni-PGE

By Norman J Page

DESCRIPTION Massive to disseminated sulfides in small shallow mafic to ultramafic intrusive with an external source of sulfur.

GEOLOGICAL ENVIRONMENT

Rock Types Flood basalts, picritic intrusive rocks, picritic gabbro, norite, olivine gabbro, dolerite, intrusive and volcanic breccias. Associated with evaporates or some external source of sulfur.

Textures Ophitic, subophitic, gabbroic, cumulate.

Age Range Paleozoic.

Depositional Environment Magma has intruded through evaporates or pyritic shale, and formed sills in flood basalts during active faulting.

Tectonic Setting(s) Rift environment.

DEPOSIT DESCRIPTION

Mineralogy Pyrrhotite + pentlandite + chalcopyrite + cubanite + millerite + vallerite + pyrite + bornite + gersdorffite + sperrylite + PGE alloys + polarite + PGE tellurides, arsenides, and antimonides.

Texture/Structure Lenses, layers of massive, matrix, and disseminated sulfide.

Alteration None related to ore.

Ore Controls External source of sulfur; sulfides form persistent basal layers to intrusion and dike-like bodies into country rock; and form in fault-bounded depressions.

Geochemical Signature Ni/Cu = 1.5 to 0.5, Co/Ni = 1/16; Pt/(Pd/Ni) = 1/500

EXAMPLES

Noril'sk, USSR

(Krauss and Schmidt, 1979)