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金川岩体母岩浆成分及其分离结晶过程的熔浆热力学模拟 [点此下载全文](#)

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摘要:

金川铜镍硫化物矿床是仅次于加拿大Sudbury和俄罗斯Noril'sk-Talnakh的世界第三大在采镍矿床。金辉橄岩、斜长二辉橄岩和橄辉岩组成, 岩相学观察表明主要造岩矿物的结晶顺序为: 橄榄石→斜方辉石→斜方辉石-硫化物-硅酸盐熔浆层, 橄辉岩-斜方辉石-硫化物-硅酸盐熔浆层和硅酸盐熔浆层。MELTS模拟计算表明金川岩体母岩浆的分离结晶经历了两个阶段: 上部岩浆房经历了约5%的橄榄石以及约4%的斜方辉石分离结晶, 并伴随硫化物熔离。在重力作用的影响下, 橄辉岩形成由下至上的分层: 橄辉岩-斜方辉石-硫化物-硅酸盐熔浆层, 橄辉岩-斜方辉石-硅酸盐熔浆层和硅酸盐熔浆层。橄辉岩-斜方辉石-硫化物-硅酸盐熔浆层最后被挤入到7.6~9.2km的浅部岩浆房, 经重力分异形成号岩体顶部的含辉橄岩。橄辉岩-斜方辉石-硫化物-硅酸盐熔浆层最后被挤入金川岩体, 并再次结晶出橄辉岩-斜方辉石-硫化物-硅酸盐熔浆层。这些计算结果不仅与野外和室内岩相学观察吻合, 也与硫化物熔离过程的最新研究结果一致。

关键词: [金川岩体](#) [母岩浆](#) [分离结晶](#) [熔浆热力学模型](#) [MELTS](#)

MELTS Thermodynamic Calculation of Compositions of Parental Magma and Fractional Crystallization of the Jinchuan Intrusion, Gansu Province [Download Fulltext](#)

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Abstract:

The Jinchuan intrusion consists of pyroxene dunite, lherzolite, plagioclase lherzolite and is the third largest magmatic Ni-Cu-(PGE) sulfide deposit in the world. Petrography indicates that the crystallization sequence of the main rock-forming minerals of the Jinchuan intrusion was olivine → orthopyroxene → clinopyroxene. On the basis of rock textures and compositions of the dominant rock-forming minerals, the more precise parental magma of the Jinchuan intrusion have been obtained by using the thermodynamic code "MELTS". The results also indicated the parental magma experienced two stages of fractional crystallization. In the first stage, about 5% olivine and 4% orthopyroxene as well as sulfide liquid immiscibility occurred in a magma chamber at a depth of about 10.9~12.5km (pressure is 3.3~3.8kbar). Stratigraphic zones from the base to the top of the deep chamber formed due to gravity segregation, including olivine - orthopyroxene - sulfide - silicate liquid, orthopyroxene - silicate liquid mush, silicate magma. The silicate magma was squeezed out first to form mafic intrusions or erupted to the surface elsewhere. The olivine - orthopyroxene - silicate liquid was squeezed into a shallower magma chamber at a depth of about 7.6~9.2km and formed the upper sequences of the Segments I and II of the Jinchuan intrusion. The olivine - orthopyroxene - sulfide - silicate liquid intruded into the shallow magma chamber, where further crystallization of olivine, clinopyroxene, formed the main rocks and sulfide ore bodies of the Jinchuan intrusion. These results are consistent with the petrography of the Jinchuan intrusion, and also are consistent with the results of recent studies on Ni-Cu sulfides.

Keywords: [Jinchuan intrusion](#) [Parental magma](#) [Fractional crystallization](#) [Melt thermodynamic mode](#)