

Melt and Fluid Inclusions and Their Constraints on Ore-Forming Conditions of Ganshaebo Rare Earth Deposit, Gansu Province, China

LI Bao-hua¹, YANG Qian-qian¹, GAO Kun-li¹, CHEN Chen¹, HUANG Zeng-bao²,
DONG Xiao-yan¹, FU Tai-yu¹

(1. College of Earth Sciences, Chengdu University of Technology, Chengdu 610059, China;

2. Geological Survey of Gansu Province, Lanzhou 731010, China)

Abstract: Ganshaebo rare earth deposit in Gansu Province, China is hosted by aegirine-augite syenite and aegirine syenite prophyry. The orebodies occur as irregular veins, lenses or layers. The ore-forming processes can be divided into four distinct periods, e.g., magmatic, magmatic-hydrothermal, hydrothermal and supergene. The main period of mineralization is of magmatic-hydrothermal. Inclusions in the deposit can be divided into seven categories, melt inclusions, fluid-melt inclusions, H₂O inclusions, CO₂ inclusions, CO₂-H₂O inclusions, daughter-bearing H₂O inclusions and daughter-bearing CO₂-H₂O inclusions. Variation of inclusion types from melt inclusion to fluid-melt inclusion + fluid inclusion and then to fluid inclusion indicates that the ore-forming medium varies from magma to magma + hydrothermal, and then to hydrothermal solution. The homogenization temperature of melt inclusions in magmatic period is 780 °C. During the magmatic-hydrothermal period, homogenization temperatures vary from 700 °C to 191 °C with salinity varying from 5.25% to 22.14% NaCl_{eqv} and ore-forming pressure varying from 68 MPa to 95 MPa that corresponding to a depth ranging from 2.6 km to 3.6 km. Homogenization temperatures of the hydrothermal period vary from 129 °C to 225 °C with salinity varying from 0.35% to 7.73% NaCl_{eqv}. The temperature gradually mainly occurred during the magmatic-hydrothermal period. The deposit belongs to mesozonal to hypozonal, and medium to high temperature magma-hydrothermal transitional deposit.

Keywords: Fluid-melt inclusion; ore-forming physicochemical condition; magma-hydrothermal transitional deposit; Ganshaebo rare earth deposit