Goldschmidt 2023 Abstract
https://doi.org/10.7185/gold2023.16424

Fluid and melt inclusions as a proxy for physicochemical conditions of charoitite formation, Murun Complex, Siberia, Russia

EMILIA DOKUCHITS, SHAO-YONG JIANG, ALEKSANDR S. STEPANOV, IRINA A. ZHUKOVA, SUO-FEI XIONG, AMJAD HUSSAIN AND OSCAR C. NKWAZEMA

China University of Geosciences (Wuhan)

Presenting Author: 1226989964@qq.com

Charoitites, the unique rocks known for its striking appearance are found in Murun alkaline-carbonatite complex, Siberia, Russia. A wide range of rocks occurred within the Murun complex: from shonkinites, syenites, ijolites, through volcanic lavas to charoitites and carbonatites [1]. The origin of charoitites has been a matter of debates since its discovery, with opinions varying from metasomatic to magmatic and hydrothermal. The study of fluid (FI's) and melt (MI's) inclusions helps in understanding physicochemical processes which led to formation of the charoitites.

Cryothermomety, Raman spectroscopy, SEM and EPMA methods were used to study FI's and MI's. The different types of FI's were recorded in quartz, apatite, tinaksite, dalyite, K-feldspar, pyroxene and alkaline amphibole: monophase liquid (L) and vapor (V) FI's, two-phase L+V FI's, multiphase inclusions with one or several daughter phases, and solid inclusions, represented by both single grain and composite mineral inclusions. Multiphase FI's contain sulfates (baryte and thenardite) and carbonates (witherite and calcite) as daughter phases. The Raman study revealed the H_2O+NaCl±N_2±CH_4 composition of the fluid system, and microthermometry showed homogenization temperatures of fluid inclusions within the ranges of 180 to 441°C (in quartz), 202 to 404°C (in tinaksite), 120 to 378°C (in apatite), 226 to 301°C (in dalyite). High temperature MI's were recorded in K-feldspar and tinaksite. However, due to decrepitation and darkening of the samples during microthermometric experiments, only partial homogenization was achieved at the temperatures >400-450°C. High temperature MI's were interpreted as primary inclusions.

This research was supported by the NSFC Project (No. 42050410318).

1. Vorobiev, E.I. *Charoite*; Zorina, L.D., Ed.; Geo Publishing House: Novosibirsk, 2008