

Post-emplacement hydrothermal remobilization and Nb–V enrichment in Amba Dongar sövites

VLADISLAV RAPPRICH¹, TOMÁŠ MAGNA¹, SHRINIVAS VILADKAR^{2,3}, ONDŘEJ POUR¹, JENS HOPP⁴, BOHUSLAVA ČEJKOVÁ¹

¹ Czech Geological Survey, Prague, Czech Republic;
vladislav.rapprich@geology.cz

² Carbonatite Research Centre, Kadipani, India

³ Dept. Earth Environmental Sci., Indian Inst. Science
Education and Research, Bhopal, India

⁴ Inst. Geowissenschaften, Universität Heidelberg, Germany

Early Paleocene Amba Dongar carbonatite complex erupted along the Narmada River Fault Zone, during the late phase of Deccan magmatism. Large-scale fluorite mineralization, which has been mined since 1964, is associated with the carbonatite body and is also a potentially perspective location for REE, Nb and other critical metals. In order to provide further constraints on the post-emplacement evolution, eight new samples of sövites were collected for petrographic and geochemical investigations from the NE part of the Amba Dongar carbonatite complex. Sövite in this part of the carbonatite ring dike is rich in pyrochlore, calcite and magnetite. Pyrochlore makes up almost 50% of some sövite samples and shows core-to-rim compositional changes. The cores of pyrochlore consist of primary fluorocalciopyrochlore with high F and Na contents while the rims gained elevated amounts of Pb, La and Ce with the associated loss of F and Na due to circulation of hydrothermal solutions. We also document the first occurrence of wakefieldite-(Ce,La) and vanadinite in sövites from Amba Dongar. The presence of wakefieldite-(Ce,La) and vanadinite points to an exceptionally high V abundance in hydrothermal solutions formed towards the end of the carbonatite magma activity.

We are grateful to the Czech Science Foundation for support through projects 15-08583S and 19-29124X.