

Melt inclusion Geothermometry as a key in magmatic evolution of deccan basalt

Choudhary B.R., Jadhav G.N.

*Department of Earth Sciences, IIT Bombay, Powai, Mumbai-400076, Maharashtra, India;
choudhary.r.babita@gmail.com jadhav@iitb.ac.in*

The crystallizing temperature works as a catalyst to initiate the nucleation of specific type of crystal development. Plagioclase phenocrysts have trapped small mass of magma as melt inclusions in the zoned as well as twinned variety, which indicate the geothermometric sequences of melt inclusions. To observe the kinetics of crystal-thermometry, we examined the plagioclase phenocryst, from Deccan basalt samples collected from the Mahabaleshwar area of Maharashtra state, India. The feldspar phenocrysts contain different types of melt inclusions. These melt inclusions significantly show variation in melting temperature. Presence of different types of melt inclusions along crystal boundaries indicated the change in composition and this may be the function of temperature. Different types of melt inclusions found in plagioclase phenocrysts are mainly amorphous and crystalline (monophase, biphasic and multiphase) and are of different shape and size. Many of them appeared as a single melt phase, some contain two phases, vapor and glass. Vapor phase appeared as a bubble. The denser (melt) appearing in the exterior part of the inclusion, while the less dense gaseous/vapor spherical in form, floating in the centre or shifted from the centre and in some inclusion it appeared at the corner of the traps.

Some melt inclusions are containing only glass/crystalline those have formed due to rapid cooling so that another phase is not coexisted. Those are trapped at high temperature as single phase after cooling they separate out in two different phase, solid as glass and vapor as bubble. They are primary in origin and existing in the section as a sample of magma trapped during crystal growth. They were entrapped at source temperature as small vapor phase and crystalline phase as melt inclusion. Variation in the commodity of these melt inclusions, itself reveals the immiscibility as well as the degassing phenomena of magma.

An attempt has been made to correlate the melt inclusion geothermometry with the evolution pattern of magma/melt that of plagioclase phenocrysts present in a deccan basalts. Heating stage experiment was carried out to find out the formation temperatures/melting temperatures of melt inclusions.