

Significance of Magmatic epidote in the Azna pluton, Iran

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Magmatic epidote can be a good indicator for the pressure, temperature and original water content of a granitoid body. The Azna syn-tectonic pluton is emplaced within shear zone of the Azna in magmatic-metamorphic belt of Sanandaj-Sirjan. Based on the relationship of $Zr + Nb + Ce + Y$ vs. $10000 * Ga/Al$ suggest an A-type character for these granite. On the tectonic discrimination plots, these granites indicate a within- plate granite character.

The main minerals in the pluton are quartz, plagioclase, microcline- perthite, biotite and phengitic muscovite and the accessory minerals are zircon, allanite, epidote and tourmaline. Plagioclase is as coarse porphyroclast. They do not display any alteration. Biotite is euhedral to subhedral. Biotites are concentrated in the main foliation. Epidote tends to be associated with the biotites; therefore epidote is abundant in the main foliation with biotite. Fine grain epidote crystals are anhedral to subhedral. They occur as faintly to conspicuously pleochroic crystals. Allanite forms cores of some epidote crystals. Generally the epidote crystals are homogenous. Electron microprobe analyses of epidotes from Anza pluton revealed low TiO_2 and pistacite content is equal to 0.27.

The lack of alteration of minerals in the rocks suggests that a late vapour phase may have been absent. The textural relations of epidote, biotite and plagioclase as described above, the lack of alteration of minerals and the involvement of epidote in the main foliation show that the epidote is truly a magmatic mineral. Magmatic epidote in a plutonic rock signifies that the rock probably crystallized at pressures of at least 8 Kbar (25-30 km depth) and they must have been removed since emplacement of the pluton.

References

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Isotopic and Geochemical characteristics of kimberlite from Raipur and Tokapal, Chattisgarh, Central India

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Four kimberlite fields have been located from Mainpur kimberlite field (MKF) in Raipur district, Chattisgarh, central India. These Kimberlite fields are Payalikhhand, Bahradih, Jangra and Kodamalli. Later Tokapal and Bhejripadar kimberlite fields (TKF) in Bastar district were reported by Geological survey. Kodamalli kimberlite of MKF was intruded in the Late Proterozoic sediments. These kimberlites occur close to the junction of Bastar craton (BC) and Eastern Ghat Mobile Belt (EGMB). Mainpur kimberlite field is located within Bastar craton close to its contact with the granulite terrain of the lower to Middle Proterozoic Eastern Ghats Mobile belts in the east. Based on mineral assemblages and texture it can be classified as hypabyssal facies group I kimberlite.

The concentration of incompatible elements for Kodamalli kimberlite is higher than kimberlite from Tokapal from the same craton. The REE concentration at Kodamalli kimberlite is similar to Bhejripadar and Tokapal. The variation of abundance ratio for Zr/Hf indicates variable intensity of metasomatism by carbonates and suggests that the source magma of the kimberlite of Kodamalli and Bhejripadar/Tokapal are different and was metasomatically enriched in different degrees prior to kimberlite generation. The Zr/Nb vs La/Yb ratios of Kodamalli and Bhejripadar/Tokapal kimberlites show that the Kodamalli kimberlites have high Zr/Nb ratio and low La/Yb ratios. The plot of Ce/Yb vs Zr/Nb shows that the source rock for Kodamalli kimberlite is different than Bhejripadar and Tokapal kimberlites. The highly fractionated REE distribution ($La/Yb > 50$) in kimberlites indicates that the source lithologies contain garnet and that partial melting occurred in the presence of garnet. The positive anomaly for Ta and Nb in both the kimberlite indicates the mantle source with residual titanite. The presence of Rb anomalies suggests the presence of residual phlogopite in the mantle.

Strontium isotopic data for these kimberlites gives an initial ratio of ~ 0.7045 at 1100 Ma. Lehman *et al.* (2002) reported $\epsilon Nd = +11.8$ at 1080 Ma for this kimberlite, which is quite different than kimberlite, from Tokapal, Bhejripadar, Majhgawan and Lattavaram ($\epsilon Nd \sim +2$ at 1080 Ma).

References

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