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Study of basalts in south of Asad Abad (north-east of Koohpayeh, Isfahan Province) with reference to very low-grade metamorphism of these rocks

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Abstract: Eocene volcanic rocks in south of Asad Abad (north-east of Koohpayeh, Isfahan Province) experienced very low-grade metamorphism (hydrothermal metamorphism), resulting in prehnite, malachite, azurite, zeolite, quartz and calcite crystallization in cavities and fractures. Chlorite (brunsvigite) and amphibole (ferro-actinolite) appear on secondary phases. Augite and labradorite are two main minerals based on electron microprobe analyses and petrography evidence. Composition of minerals in these volcanic rocks and xenoliths are similar. Field and microscopic evidence show that an alternation of acidic and basic magmatism has occurred in the study area. Very low-grade metamorphic minerals formed in neutral to slightly alkaline PH, low CO_2, at temperature of 200-400°C and pressure lower than 3 Kbars. Based on calculations, clinopyroxene and plagioclase phenocrysts in basaltstic magma in the study area have formed at temperature of 1100°C and pressure of 3.17 Kbars corresponding to a depth of 11 Km. Chemistry of volcanic minerals and open space fillings minerals is close, both are rich in Ca, Si and Al and relatively poor in Fe, Na, K and Mn. This shows that the volcanites chemistry had important role in composition of metamorphic minerals. On the basis of the geochemical studies and tectonic setting patterns, these rocks are volcanic arc basalts. These basalts belong to the calc-alkaline magmatic series.

Keywords: *Basalt, Eocene volcanism, Very low-grade metamorphism, Koohpayeh.*