Petrographic Characteristics; Insights into Post-magmatic hydrothermal alteration of the Gharyan Phonolites, NW Libya

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Abstract

The mineralogical studies of Gharyan phonolites are required to re-evaluate the hydrothermal alteration processes and to describe the chemical and physical properties of fluids by which the hydrothermal replacement took place. The preliminary results of this work based on petrographic and mineralogical analysis and typification and quantification of phonolite's alteration products within thirty samples collected from the Gharyan volcanic province show that the subvolcanic

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Gharyan phonolites have been exposed to hydrothermal conditions that led to zeolitization and sericitization processes followed by zeolite (analcime and natrolite) and sericite precipitation, respectively. The replacement of nepheline by analcime is clearly observed in many euhedral grains of nepheline. It was occurred as partially, moderately and/or wholly transformation. In some cases, the pseudomorphs inherited some details from the crystalline structure of the nepheline. A few grains of calcite were also occurred as replacement product within the matrix of one sample. It is most likely to be formed as consequence of replacement of apatite with calcite.

***Keywords**: Hydrothermal alteration, Alteration product, Analcime, Zeolite, Gharyan phonolites.*