Crystal size distribution studies on the leucite, pyroxene and olivine at the eastern Urmia Lake volcanic rocks- magma mixing possibility and residence time at the chamber

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Abstract: The study area is located at the eastern Urmia Lake near Aghgonbad village with 1Km distance from Eslami peninsula. The rocks are under saturated and belonging to the Cenozoic to Pelio-Quaternary with shoshonitic affinities and are phonolite to luteitic. The chondrite normalized REE patterns show LREEs enrichment related to HREEs. Some geochemical characteristics are correlated with continental within-plate setting and have post-collisional resemblance accompany with crustal contamination. Crystal Size Distribution (CSD) patterns have been drawn for leucite, pyroxene and olivine crystals. It is observed that the curve is fractured and curvature for leucite, with fine and coarse grains, that is sign of two magma mixing. But the patterns for olivine and pyroxene are linear. The average times for nucleation, growth and suspension at the chamber for leucite fine grains and olivine are less than 100 years and for pyroxene and coarse leucites residence time are >200 years, if growth rate is $10^{-11}$ cm/year. The intercept values calculations show that at least 12 silicate nuclei at the same time was formed, at the chamber.

Keywords: CSD; leucite; pyroxene; olivine; nucleation rate; residence time.

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