

Petrochemistry of Aghajari Formation sandstones in folded Zagros zone, Iran

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The petrographic and chemical analyses of 15 sandstone samples from the Upper Miocene-Pliocene Aghajari Formation of the folded Zagros zone, Iran, were carried out by the polarizing microscope and inductively coupled plasma mass spectrometer (ICP MS) respectively. The framework grains of the Aghajari Formation sandstones are rich in quartz followed by lithic grains and depleted in feldspar and mica (predominantly white mica). The sandstones are dominantly lithic-arenite and sublith-arenite in composition with abundant low-grade metamorphic and sedimentary lithics, low feldspars and no volcanic detritus. This suggests that the sands were derived from transitional and quartzose recycled orogen provinces. The Aghajari Formation sandstones have low to moderate SiO₂ contents (28.68–59.68%; on average 47.18%), while TiO₂, Al₂O₃, Fe₂O₃ + MgO and CaO have average amount of 0.25%, 4.85%, 2.2% and 27.19% respectively. The Aghajari Formation sandstones are generally enriched in CaO and depleted in Al₂O₃, Fe₂O₃ and Na₂O. The chemical index of weathering (CIW) values for the Upper Miocene- Pliocene Aghajari Formation sandstones vary from 76 to 85 with an average value of 82, indicating high weathering of the source areas. The geochemical characteristics suggest an active continental margin to passive margin setting for the Aghajari Formation sandstones, and preserve the signatures of a recycled provenance. The La/Sc (~2.31), Th/Sc (~0.56), La/Co (~1.03), Th/Co (~0.25), and Cr/Th (~64.84) ratios as well as chondrite-normalized REE patterns with flat HREE, LREE enrichment, and negative Eu anomalies indicate derivation of the Aghajari Formation sandstones from intermediate and felsic rock sources.