

CALIBRATION OF A MEXICAN NUCLEAR REACTOR FOR $^{40}\text{Ar}/^{39}\text{Ar}$ DATING

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We report the first $^{40}\text{Ar}/^{39}\text{Ar}$ analyses done entirely in Mexico. The samples have been irradiated in the central thimble of the nuclear reactor TRIGA MARK III from the Mexican Instituto Nacional de Investigaciones Nucleares (ININ). The fast neutron flux (approximately $2.0 \times 10^{13} \text{ n} \cdot \text{cm}^{-2} \cdot \text{s}^{-1}$) is comparable to the TRIGA reactor of the USGS in Denver, Colorado. The calibration curve has been obtained with an internal biotite standard ($282 \pm 2 \text{ Ma}$) calibrated using the amphibole Mmhbl. The obtained vertical flux gradient varies up to 50% within a distance of 15 cm, but the curve fits well to a 3-degree polynomial. The undesired K, Ca and Cl reactions have been calibrated as usual with CaF_2 , K_2SO_4 and KCl. After irradiation, the samples were stored for 1 month to allow a substantial decay of the short half-life products. The isotopic measurements were done at the Universidad Nacional Autónoma de México (UNAM) with a MM1200 mass spectrometer attached to a computer for automatic peak switching, data acquisition and processing. Gas extraction from samples was done with a double vacuum electron bombardment furnace with a tantalum crucible. The evolved gases were purified with a Ti sponge and a SAES getter. The data present a promising future for $^{40}\text{Ar}/^{39}\text{Ar}$ geochronological work in México, where an important volume of work in this field remains to be done. The most notable areas of interest at this moment are the precise dating of several volcanoes from the Mexican Volcanic Belt and Sierra Madre Occidental and the dating of ore deposits.