Precise $^{40}\text{Ar}/^{39}\text{Ar}$ dating of sanidine, microcline, alunite and adularia from Fresnillo mining district provide the beginnings of a reliable temporal framework that links the magmatic and mineralization history. This important district, discovered in 1554 currently produces silver from a system of low sulphidation epithermal veins. In the last five years, four new veins have been discovered to the southwest considerably expanding the size of the district. Despite some metal zoning indicated by slight variations in gold grades, these recently discovered veins are mineralogically and texturally similar to the previously described veins, consisting of crustiform banding of quartz and calcite with base metal sulfides, silver sulphosalts, electrum and gold. These similarities suggest a genetic link between old and new discoveries. A better understanding of the district as a whole is necessary and timing relationships between mineralization and magmatic activity across the district are badly needed.

New $^{40}\text{Ar}/^{39}\text{Ar}$ ages of sanidines from the volcanic units, microcline from an intrusive, alunites from the acid sulfate alteration zone as well as three adularias within the recently discovered Jarillas and Valdecañas veins accurately define eruption and mineralization history. Volcanism occurred between 44.73 +/- 0.06 Ma and 31.10 +/- 0.16 Ma, magmatic intrusion at 34.30 +/-0.2 Ma, alteration between 31.03 +/-0.16 and 31.03 +/-0.11 whereas adularia dates indicate that mineralization occurred at 29.7 +/- 0.2 Ma and 30.60 +/-0.30 Ma.

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