

Geochemistry of microgranular enclaves and host granodiorite from Oledo, Central Portugal

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The Iberian massif corresponds to the southwestern extension of the European Variscan Belt. The Ordovician magmatism is rare in the Central Iberian Zone of this massif. A medium-grained biotite granodiorite from Lower Ordovician of 479-480 Ma crops out at the Oledo-Idanha-a-Nova pluton. It intruded the Cambrian schist-metagreywacke complex, is deformed and contains fine-grained biotite tonalitic and biotite granodioritic microgranular enclaves, which are darker and richer in mafic minerals than the host granodiorite. The microgranular enclaves show rounded or ovoid shapes, some of them irregular, having sharp, occasionally crenulated and diffuse contacts. Microgranular enclaves and host biotite granodiorite are peraluminous ($A/CNK=1.00$ to 1.13) and contain quartz, K-feldspar, albitelabradorite, amphibole, biotite, sphene, allanite, zircon, monazite, apatite, ilmenite and magnetite. Variation diagrams of the rocks and their biotite, sphene, allanite and ilmenite show trends of fractionation from tonalitic enclaves to host granodiorite. The rare earth element (REE) patterns are subparallel. All REE contents decrease, the negative Eu anomaly increases and anorthite content of plagioclase decreases from tonalitic enclaves towards the host granodiorite. Biotite composition shows fractionation with decrease in deformation of host granodiorite. The least squares analysis of major elements and modelling of trace elements indicate that granodioritic enclaves and host biotite granodiorite were derived from the tonalitic magma by fractional crystallization of plagioclase, amphibole, biotite and ilmenite. The $(^{87}\text{Sr}/^{86}\text{Sr})_{480}$ ratio (0.7050-0.7067), $\epsilon_{\text{Nd}480}$ (1.56-3.46) and $\delta_{18}\text{O}$ (6.00-8.92‰) values indicate that they are I-type granitic rocks and contain a mantle component. The decrease in $(^{87}\text{Sr}/^{86}\text{Sr})_{480}$, irregular variation of $\epsilon_{\text{Nd}480}$ and increase in $\delta_{18}\text{O}$ from tonalitic enclaves to host biotite granodiorite suggest that another mechanism has also occurred, probably mixing with other magmas or are related to deformation.