

Petrography and Geochemistry of Sepeda Li-rich aplite-pegmatite dyke swarm (Montalegre, N Portugal)

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The Sepeda aplite-pegmatite dyke swarm is situated in the Barroso-Alvão region (Montalegre, Northern Portugal) and is currently a strategic Li ore deposit in Europe. Geologically, it is located in the Parautochthonous Thrust Complex of the Galicia-Trás-os-Montes Zone (Variscan Iberian Belt), more exactly on its southern edge, next to the Central-Iberian Zone.

Numerous aplitic and pegmatitic bodies, considered of the LCT type (e.g. Noronha *et al.*, 2013), that cross cut the host metasediments of Silurian age were recently targeted in a diamond drilling campaign. From 4 drill hole logs with suspected Li mineralizations, 120 samples were selected for whole-rock chemical analysis and also 13 samples for thin section preparation.

Petrographically, the Sepeda pegmatitic rocks are characterized by distinctive igneous textures that include the following major crystalline phases: K-feldspar, plagioclase, quartz, muscovite, petalite and spodumene. The latter is commonly altered to other Li bearing minerals such as eucryptite and cookeite. The most common accessory minerals are the phosphates montebrasite and apatite and the opaques cassiterite and sphalerite. Additionally, there are strong evidence of solid state deformation like the dynamic recrystallization of quartz and bent muscovites in addition to plagioclase and K-feldspar flexured twins.

In relation to whole-rock geochemistry, these intrusive rocks are mainly felsic with SiO₂ contents ranging between 60,97 and 85,78%. The lithologies of intermediate compositions are mostly the aplitic types occurring at shallower depths. With regards to Li₂O, the concentration interval varies from 0,01 up to 4,13% where the richer samples (>1% of Li₂O) are the pegmatites with approximately 74% of Si₂O in which petalite is the major constituent. Other relevant trace element is Sn reaching 2100 ppm in opposition to Cs (1,68 - 191,50 ppm) and Ta (1,10 - 97,40 ppm). They also show low concentrations in ΣREE (1,37 - 5,61 ppm) with strongly variable Eu anomalies ($0,36 \leq \text{Eu}/\text{Eu}^* \leq 2,98$).

Noronha *et al.* (2013), In: R. Dias *et al.* (Eds.), *Geologia de Portugal*, Escolar Editora, 1: 403-438.

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