

# **U-Pb LA-ICP-MS Zircon-Monazite-Columbite-Tantalite Dating of Mapatizya Lithium Pegmatites in the Choma–Kalomo Block, Southern Zambia**

IRENA PEYTCHEVA<sup>1</sup>, CRYTON PHIRI<sup>2</sup>, MARKO HOLMA<sup>3</sup>, STOYAN GEORGIEV<sup>1</sup>, ELITSA STEFANOVA<sup>1</sup>  
AND MILEN STAVREV<sup>1</sup>

<sup>1</sup>Geological Institute, Bulgarian Academy of Sciences

<sup>2</sup>University of Zambia (UNZA)

<sup>3</sup>Kerttu Saalasti Institute, Oulu University

Zambia is an African country with a high potential to supply cobalt, nickel, lithium, and other critical and strategic raw materials, but there is a scarcity of data on the mineralogical associations and geochemical signatures of many medium- to large-scale deposits. Here, we present the first results on the geochronology of the Mapatizya lithium pegmatites (MLP). They are hosted within the Paleo- to Mesoproterozoic Choma-Kalomo Block (CKB) in southern Zambia. The CKB consists of metasedimentary rocks intruded by S-type granites of the Mesoproterozoic Choma-Kalomo Batholiths. Previous U-Pb dating in the region revealed the complexity of this granitic system, spanning in age from  $\sim 1345$  to  $\sim 1170$  Ma<sup>[1]</sup>. Three types of pegmatites have been recognised within the metasedimentary sequence and the granites of the CKB: (1) quartz-muscovite, (2) quartz-muscovite-biotite-feldspar-tourmaline, and (3) cassiterite-bearing quartz muscovite  $\pm$  feldspar pegmatites. Mapatizya pegmatite system reveals features of group (2)-(3) granitic pegmatites, commonly classified as LCT (lithium-cesium-tantalum) type.

U-Pb LA-ICP-MS dating was applied to zircon and monazite from the host granite and to columbite-tantalite (coltan) from the MLP, which also intrude the metasedimentary basement of the CKB. The zircons are metamict and mainly discordant, with only two grains being (sub)concordant at  $1189 \pm 37$  Ma (all uncertainties  $2\sigma$ ). The monazites of the granite are mostly concordant, ranging in age from  $1169 \pm 14$  Ma to  $1302 \pm 44$  Ma, with a main group of concordant monazites at  $1205 \pm 15$  Ma. Age data for coltan from the MLP are primarily concordant, with few subconcordant grains. The main group is dated between  $1126 \pm 16$  Ma and  $1060 \pm 15$  Ma, yielding a Concordia age of  $1080.4 \pm 5.0$  Ma, while a second group defines an age of  $1001.6 \pm 8.8$  Ma. We, therefore, suggest that the age of the pegmatites is  $>1080$  and  $<1200$  Ma and that columbite-tantalite was slightly altered by a tectonic-metamorphic event around 950–1000 Ma.

Acknowledgments: This research is a contribution to the AGEMERA project funded by the EU Horizon Europe research and innovation program, grant 101058178.

[1] Glynn et al. 2017. Precambrian Research 298:421–438.