Characterization of Detrital Xenotime-(Y) from the Goias Tin Province, Brazil

D. COSTA-FILHO[1*], N.F. BOTELHO[1], A.P. GYSI[2]

[1] Universidade de Brasília, Instituto de Geociências, Campus Darcy Ribeiro, 70910-900 Brasília, Brazil (*correspondence: deusavan.cf@gmail.com; nilsonfb@unb.edu)

[2] Department of Geology and Geological Engineering, Colorado School of Mines, Golden, CO 80401, USA (agysi@mines.edu)

The Goias Tin Province (GTP) consists of twenty granitic bodies and pegmatitic dikes of Paleoproterozoic to Neoproterozoic ages. The most important tin deposits are related to Paleoproterozoic to Mesoproterozoic A-type granites with high contents of F, Sn, Rb, Th, and REE. Their enrichment in REE is known by far, but only recently has an economic significance been reported, associated with alluvial concentrations, high contents in some tin deposits and a new type of adsorption REE deposit in Brazil, hosted in the Serra Dourada Granite (SDG) massif [1]. The goal of this study is to characterize the textures and compositions of detrital xenotime-(Y) and use this information as a petrogenetic indicator for the evolution of the source plutons in the GTP.

The provenance of detrital xenotime-(Y) grains are from the SDG, one of the largest body of the GTP covering an area of ~650 km2. The main facies is a biotite granite consisting of quartz, perthitic orthoclase, oligoclase, and biotite. Zircon, apatite, monazite-(Ce), xenotime-(Y), fluorite, ilmenite, pyrite, and chalcopyrite are the main accessory minerals. Zircon U/Pb dating yields an age of 1.769 Ma [2]. The majority of xenotime-(Y) grains are ~ 500 μm in size and exhibitan euhedral habit with tetragonal bipyramidal forms.

Xenotime-(Y) compositions analyzed by EPMA yield concentrations of 45.37 wt.% Y2O3, 30.89 wt.% P2O5, 21.3 wt.% of heavy (H)REE, and 1.07wt.% of UO2. The main HREE is Yb2O3 with a concentration of 4.32 wt.% followed by 4.28 wt.% Dy2O3 and 4.20 wt.% Er2O3. Fine inclusions of thorite, uraninite, and monazite were identified by EDS analysis. The characterization of this detrital xenotime-(Y) is the first step of a thermodynamic study aiming at fingerprinting the physico-chemical evolution of the SDG. This study will aid in the qualibration of a solid solution model of HREE incorporation in natural xenotime-(Y) [3] with a contribution in the understanding of the HREE ore-forming processes in the SDG.

Santana et al. (2015), *J.Geochem Explor*. **155**, 1-13. [2] Pimentel & Botelho (2001*), An. Acad. Bras. Cienc.*. **73(2)**. [3] Gysi et al. (2016), *Thermochim. Acta*. **627-629**, 61-67.