

Possible high U effect on secondary ion mass spectrometry (SIMS) of cassiterite U-Pb dating

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High U effect on secondary ion mass spectrometry for U-Pb isotopic analysis has been found for zircon[1]. Cassiterite (SnO₂) is a common mineral in tin and sulfide deposit. Carr et al. (2017) reported SHRIMP U-Pb isotopic compositions of cassiterite for the first time and proved that crystal orientation of cassiterite does not appear to affect important analysing parameters. We preliminary evaluated high U effect on CAMECA IMS1280-HR of cassiterite U-Pb dating. Our results are shown in the figure below (Fig.1, 2).

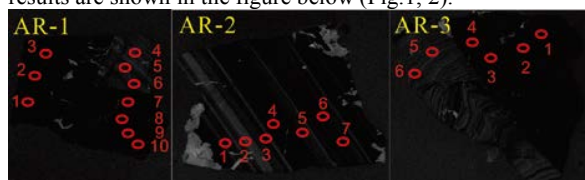


Fig 1: Cathodoluminescence images of cassiterite indicate that samples have different textures and elements concentration.

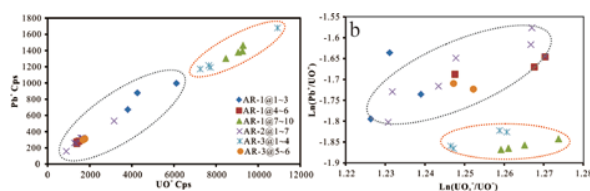


Fig 2: SIMS AR cassiterite data used in this study. a. plot of UO^+ versus Pb^+ indicates linear relationships between measured $^{206}Pb^+$ and the measured $^{238}U^{16}O^+$. b. plot of $\ln(UO_2^+/UO^+)$ versus $\ln(Pb^+/UO^+)$ displays that different regions of samples have different relationship, data of samples can not define a slope with high confidence.

Discussion of Results

The relationship between $\ln(UO_2^+/UO^+)$ and $\ln(Pb^+/UO^+)$ in high U concentration region of cassiterite is different from that in relatively low U region, even similar slope can not be defined. It means that the U-Pb fractionation calibration may be affected by the uranium content in U-Pb dating process.

[1]White & Ireland (2012) *CG* **306-307**, 78-91. [2] Carr *et al.* (2017) *CG* **467**, 122-133.