Disruption of isotopic age by metamorphism: How can two isotopic clocks can be desynchronised, in a single mineral

Adrien Vezinet*[1], Emilie Thomassot[2,3], D. Graham Pearson[1], Yan Luo[1], Chiranjeeb Sarkar[1]

1 Department of Earth and Atmospheric Sciences, University of Alberta, Canada.

2 Centre de Recherches Pétrographiques et Géochimiques (CRPG), France.

3 Géosciences Montpellier, Université de Montpellier, France.

High-grade metamorphism often disrupts the isotopic signatures of rocks and minerals. Processes occurring during high-grade metamorphism are best captured through *in-situ* isotope measurement of reactive minerals such as titanite ($CaTiSiO_5$). To constrain the effect of metamorphism on isotopic signatures at the crystal scale, we examined the U–Pb and Sm–Nd isotope systematics of titanite from an early Archean meta-sediment of the Saglek Block (Labrador, Canada). Titanite yields U–Pb apparent age that is *ca*. 900 Ma younger than the Sm–Nd apparent age, even though both ages are statistically robust. As such, there is a mismatch between U–Pb and Sm–Nd isotopic clocks. We interpret this mismatch as an imperfect isotopes mixing occurring during crystal growth. These findings advocate REE mobility in metamorphism, although REE homogenization was incomplete at the time of titanite crystallization, and demonstrates that significant mixing can go unseen if using single isotope systematics.

Mots-Clés : Archean geology; titanite; U–Pb/Sm–Nd isotopes; laser ablation split stream; metamorphism

Merci de ne rien inscrire dans cette zone et ne pas modifier les marges des pieds de page et entêtes.