

# Discovery of a new rare element pegmatite field in the Southern Gothenburg Archipelago, western Sweden

Laszlo Zorc<sup>a,b</sup>, Thomas Zack<sup>c</sup>

<sup>a</sup>Department of Earth Sciences, University of Gothenburg, Sweden; <sup>b</sup>Zinnwald Lithium GmbH, Freiberg, Germany, Laszlo.Zorc@zinnwaldlithium.de; <sup>c</sup>Department of Earth Sciences, University of Gothenburg, Sweden, thomas.zack@gu.se

Detailed petrographic and geochemical mapping (using handheld XRF) on Donsö, Styrö and Vrångö of more than 50 pegmatite bodies revealed the full transition from barren to rare element pegmatites (beryl and chrysoberyl-bearing). Together with LA-ICP-MS trace element analysis, the degree of fractionation can be seen in parameters such as Ba/Rb, Rb/Sr and trace element concentrations of Li, Ta and Cs in muscovites and feldspars, with the larger fractionated pegmatites containing garnet and the most fractionated beryl and chrysoberyl. Of particular significance is the age of the pegmatites of between 1.52 and 1.56 Ga. Such an Gothian age within the Idefjorden terrane distinguishes them from otherwise similar pegmatites from the mainland that are clearly associated with the Sveconorwegian orogeny (for example the well-known 1.03 Ga old berylbearing Högsbo pegmatite is <10 km away from Donsö). The new ages can be linked to the late deformation event that occurred 1.56-1.54 Ga in this part of the Idefjorden terrane. At this time, widespread migmatitisation was associated with high grade metamorphism. However, a clear link between migmatitisation and pegmatite origin cannot be made, as this time frame overlaps with the last intrusive stage of the Hisingen suite. This study also reveals that the dating technique employed, in-situ Rb-Sr dating of micas, has great potential easily delineating pegmatite provinces, even in areas with polymetamorphism. While biotites give Sveconorwegian ages (938 to 973 Ma; interpreted as thermally activated resetting, with the youngest potentially indicating a cooling age at ca 350°C), muscovites Rb-Sr ages are exclusively Gothian in age, demonstrating that they are not affected by the apparent thermal overprint.