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P39 - A technique for measurement of the stable boron isotope ratio.

Friday, 11 July 2014 13:00 (1 hour)

Much of the work done at the Lund Ion Beam Accelerator Facility during the last decade has been devoted to technical and analytical development for analysis of isotopic ratios in samples of geological nature. The last major steps in the chain are now ready by the introduction of the double-sided silicon strip detector (DSSSD) [1] and a modern VME-based data acquisition system. Presently we have established techniques for measuring carbon, hydrogen and oxygen isotopic ratios [2-4] by various nuclear techniques like elastic scattering, NRA and pNRA.

In parallel we have operated an extensive boron analysis program where a nuclear reaction p+11B going to three "high energy"alpha particles was used. [6]. In this work we will present an expansion of this project to measurement of boron isotopic ratios (10B/11B) utilizing a combination of NRA and pNRA techniques. The motivation for this is that boron is an important tracer of chemical recycling in the Earth, as a result of the high solubility of boron in aqueous fluids and silicate melts. The isotopic fractionation of boron is strongly dependent on how boron is coordinated by its nearest anions [6], 10B has a preference for the tetrahedral BO4-configuration, while 11B prefers the trigonal BO3-groups.

The technique will be illustrated by data from the standard homogeneous tourmaline sample but illustrations from non-homogenous samples will also be included.

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