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P41 - An evaluation of the proton-proton scattering method for hydrogen measurement in geological samples.

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We performed a comparison of the facility for hydrogen measurement available at the microprobe facility in Munich (SNAKE) with the one developed at Lund Ion Beam Analysis Facility (LIBAF).

The motivation for study of trace amounts of hydrogen in geological samples comes from Nominally Anhydrous Minerals (NAMs). They are a class of geological materials containing water although no water is expected. The presence of water in a material, even in trace amounts changes a number of physical properties of materials and constitutes an important field of study for geologists, but commonly used methods like IR-, Raman- or Secondary Mass Spectrometry require calibration by IBA methods at these low concentrations of hydrogen [1].

The method used by us for hydrogen evaluation is pp-scattering with a Double Sided Silicon Strip Detector (DSSSD). This has been shown to be a very sensitive method [2]. In fact it is the only method for 3D hydrogen microscopy with a sub- μm resolution and at sub-ppm sensitivity. Such a setup for hydrogen measurement is available at SNAKE where it has been tested extensively. A similar detector setup based around a circular DSSSD has been developed at LIBAF [3]. We tested and compared our two setups. As test samples we used a number of hydrogen rich and hydrogen poor geological samples.

The geological samples used for the evaluation are the minerals zoisite and orthopyroxene. Samples have been previously tested with SIMS [4]. The current experiment provides a validation of the setup and measurement methodology used at LIBAF.

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