inclusions) or micro-features of minerals (e.g., zoning) not amenable to bulk methods. *In-situ* measurements in geochronology has been carried out with ion-microprobes, but isobaric and molecular mass interferences restrict the scope to special systems where the problem is minimal. AMS can be used to alleviate this mass interference problem, and opens up the prospect of a less restrictive *in-situ* microanalysis for geochronology. At CSIRO, a microbeam AMS system designed to achieve this capability is under construction. With this system, several interesting applications such as the Re-Os system became accessible more conveniently. The U-Pb system becomes accessible for hydrous minerals, and Rb-Sr systems for Rb rich samples. In addition, AMS allows determination of trace elements at lower level than those accessible with the proton microprobe. The paper will discuss these prospects and describe the AUSTRALIS system (AMS for Ultra Sensitive TRAce eLement and Isotopic Studies) being developed at CSIRO.

**THE AUSTRALIS MICROBEAM ION SOURCE**

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The AUSTRALIS (AMS for Ultra Sensitive TRAce eLement and Isotopic Studies) system being developed at the HIAF laboratory is a microbeam AMS system designed for *in-situ* microanalysis of geological samples for ultra-trace (sub-ppb) and isotopic data. In the first stage of the development now completed, the microbeam source was implemented by modifying a HICONEX source. The modification results in a versatile source that can be used both for high intensity macrobeam applications, as well as microbeam. The sample chamber features a sample viewing system at normal takeoff angle, in the reflected geometry, enabling live observation of the sputtering process and visual tuning of the microbeam. A microbeam of Cs⁺ as small as 30 microns in diameter has been obtained in the tests. The secondary ion extraction system features a "screen" electrode that is used to correct the microbeam trajectory affected by the secondary ion extraction field, in order to return it to the geometric center of the sample. The paper will describe the source, sample chamber and results of the test.

**A FAST ISOTOPE SWITCHING SYSTEM FOR HIGH ENERGY IONS**

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To achieve the high precision required for isotopic ratios in geochronological applications of AMS, a fast isotope switching system has been implemented for the AUSTRALIS (AMS for Ultra Sensitive TRAce eLement and Isotopic Studies) system being developed at the HIAF laboratory. Slow drifts in the accelerator stability as well as in beam transport components dictates that the sequence of isotopes of interest should be counted for as short an interval as possible. For a narrow range of transmission typical for most analyzing magnets, fast switching (<1 ms) of the field is not possible if steady state is also desired. We have thus devised an electrostatic means to modulate the beam trajectory in a static magnetic field. The system is based on a pair of deflector plates sets, deflecting in the orbit plane, at the entrance and exit of the high energy analyzing magnet. Originally designed as an energy modulator, the principle readily adapts as an isotope switcher. The paper will discuss the design of the system and its performance.