Contribution ID: **8** Type: **Poster**

P12 - Use of a capillary microprobe for heavy ion microbeams in Ion Beam Analysis and MeV SIMS

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

The capillary microprobe at the Laboratory of Ion Beam Physics at ETH Zurich has recently been demonstrated as a useful tool to generate microbeams, even for heavy ions and in air. As ions are collimated to micrometer diameters without focusing, the microprobe is neither limited in particle mass nor energy. Recent results for STIM in air showed its applicability and the advantage of heavy ions e.g. in experiments with thin samples, where contrast could be increased using iodine ions.
This prior work with heavy ions encourages the use of our capillary microbeam in a MeV SIMS setup. Heavy projectiles with MeV energies increase secondary ion yields from the bombarded surfaces and cause a decrease in fragmentation of secondary ions [1]. Such high molecular yields combined with the microprobe' s micrometer level spatial resolution will enable MeV SIMS imaging for medical and biological applications, where molecular information is most valued.
While typical quadrupole microprobes are limited in particle mass and energy due to the beam rigidity, the capillary microprobe has no such limits and is expected to allow for a further exploration of secondary ion yields with heavier MeV ions than demonstrated so far. For now we will present our results on the investigation of the capillary microprobe's performance as well as show the planned setup for MeV SIMS, which is currently being built.

[1] BN Jones, J Matsuo, Y Nakata, H Yamada, J Watts, S Hinder, V Palitsin, and R Webb, 'Comparison of MeV monomer ion and keV cluster ToF-SIMS', Surface and Interface Analysis, Vol. 43, Issue 1-2, p. 249-252, Jan-Feb 2011

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Session Classification: Poster Session with Cheese and Wine