Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)

MTT37-P03 Room:Convention Hall Time:May 21 17:15-18:30

Development of NanoAMS

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Recent years, we are expanding our knowledge to deep sea, deep earth, and space. Based on the samples collected from the earth and space, it is possible to study early geological history and very deep earth. However important geochemical information is located very small region in rock and mineral samples. In addition it is necessary to develop the nano-scale analytical instrument to study element distribution in a single biological cell. Thus the development of Nano-scale Accelerator Mass Spectrometry (NanoAMS) is highly desirable.

(1) Feature of NanoAMS
We aim at the development of the machine to detect trace elements and isotopic ratios of samples at 50 nano-meter scale. It may be possible to extract an important information from 1 micron scale melt inclusion in minerals, interfacial mass between minerals, inside of biological cell, aerosol, tiny suspending particle in sea water, fossil of cellular membrane, and cosmic dust.

(2) Component of NanoAMS
We develop two types of ion source. First one is the secondary ion source of NanoSIMS (Cameca) with 30-50 nano-meter resolution. Second one is ICP ion source with a laser ablation system with 60 nano-meter resolution. Both ion sources are connected with AMS (NEC, 6MeV). It is necessary to develop the interface between the nano-ion source and AMS. Post ionization system is also invented.

Keywords: AMS, NanoSIMS, Isotopes, Trace elements