

Miniaturization of an accelerator mass spectrometer with a functional ion beam transmission membrane

- Separation of interfering particles with a permeable membrane using ion channeling
- Enables dramatic downsizing of accelerator mass spectrometer (AMS)
- No gas stripper is needed and the efficiency of separation of similar heavy atoms is significantly improved.

Keywords : Accelerator mass spectrometer (AMS), Stripper, Degradar, Dating

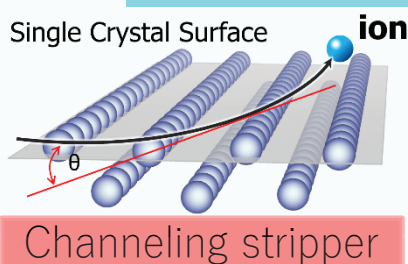
The newly developed ion beam functional permeation membrane is used as a filtering system in AMS.

① For separation of isobaric molecules

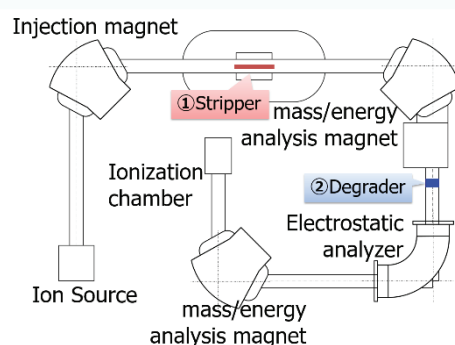
Channeling stripper

② For separation of isobaric atoms

Channeling degrader

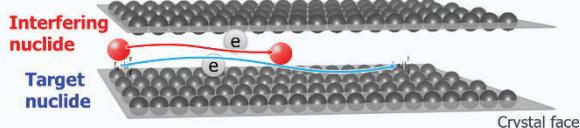


Channeling stripper



Schematic diagram of AMS equipment

Difference in energy loss due to electron impact



Channeling degrader

Task (Common principle)	Conventional technology	This technology
① Fractionation of isobaric molecules (Dissociation by electron impact)	Name: Gas stripper Method: Passing through the gas Problem: Gas diffusion	Name: Channeling stripper Method: Specular reflection on the crystal surface Effect: No gas required
② Fractionation of isobaric atoms (Atomic number dependence of stopping power)	Name: Degradar Method: Passing through an amorphous film Problem: Low transmittance	Name: Channeling degrader Method: Channeling with single-crystal films Effect: High transmittance

Stage of Technology

- Basic research
- Applied research
- Practical development
- Productization
- Commercialization

Fields of use

- Accelerator mass spectrometry (AMS)
- Ion beam

Information of intellectual property

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A.Matsubara, N.Fujita, and K.Isii, Nucl.Instrum.Methods,
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Technical details



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