

H and D Depth Analysis by HFS/DFS

Using recoil scattering by high energy ion beam, deuterium depth profile can be acquired. Scattered deuterium can be detected simultaneously at RBS / HFS measurement, so accurate composition and depth profile, including hydrogen and deuterium can be evaluated. using μ -size ion beam, this method can also be applied to small areas ($\sim 100\mu\text{m} \times 400\mu\text{m}$).

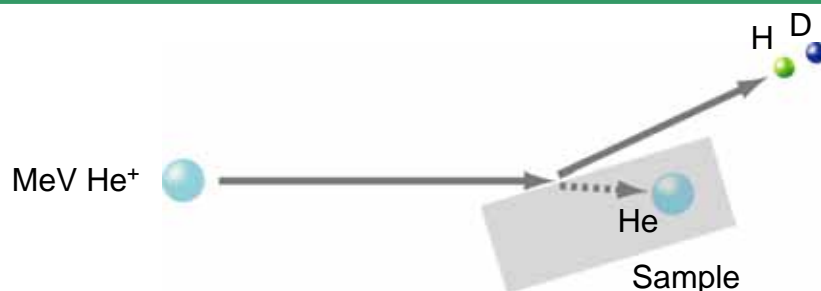


Fig.1 Geometry of HFS / DFS measurement

RBS / HFS analysis can give you accurate composition, including hydrogen. MeV ion beam is irradiated to samples, then backscattered He and forward scattered H and D are detected. Improvement of quantification method has enabled deuterium depth profile analysis(= DFS) .

HFS / DFS : Hydrogen / Deuterium Forward scattering Spectrometry

Depth profile analysis of deuterium-containing SiN film

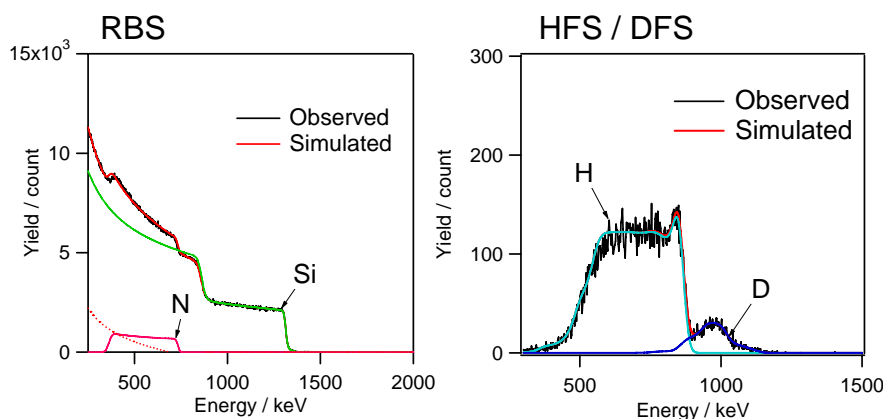


Fig.2 RBS / HFS / DFS spectra of SiN film

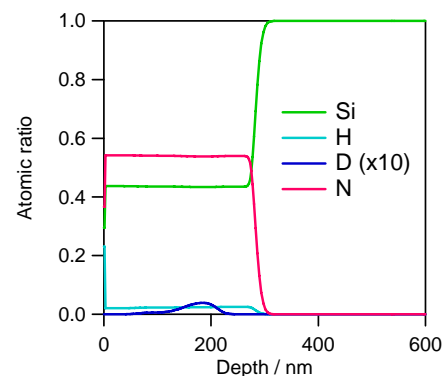


Fig.3 Depth profile

atomic%				Areal Density($\times 10^{15}$ atoms/cm ²)	
Si	H	D	N	H	D
43.5	2.4	0.1	54.0	63.2	3.0

Table 1 Composition and Areal Density of SiN film

- Depth analysis of H, D
- Accurate quantification
- Detection limit
H : 0.2 at.%, D : 0.01 at.%

