

Microstructural Characterization Station for Nuclear Materials

Purpose:

Enforce the microstructural characterization techniques of radioactive nuclear materials for use in studies of ageing issues of light water reactors such as irradiation embrittlement.

Outline:

This facility consists of two three-dimensional atom probes (3DAPs) equipped with a wide range detector or a reflectron for high mass resolution, a transmission electron microscope with various sample preparation tools and hardness testers, all of which are installed in the control area for radioactive materials. Materials used in nuclear reactors can be investigated in this area.

Specifications:

- (1) 3DAP with wide range detector for atom probe
 - Detector with a large diameter (80mm) and fast sampling rate
- (2) 3DAP with high mass resolution
 - Equipped with a reflectron possessing mass resolution of $\Delta m/m \sim 1,000$
- (3) TEM with various sample preparation tools
 - Ion slicer
 - Holder station to prevent oxidization and contamination of samples
 - Plasma cleaner
 - Twin-jet electro-polishing machine
 - Automated etching machine
- (4) Hardness testers
 - Nano-indenter for surface/small area hardness measurement
 - Automated measurement for a large number of samplings
- (5) Refurbishment of control area
 - For work efficiency and safety

Location and date of installation:

Komae Area, March 2009



3-dimensional atom probe
(left) Laser atom probe with wide-range detector
(right) Atom probe with reflectron



Transmission electron microscope
(left) Ion slicer
(center) Holder station
(right) Plasma cleaner



Nano-indenter