Kobayashi Lab.

Utilization of metallurgy for safety, reliability and sustainability of nuclear systems

Laboratory for Advanced Nuclear Energy (LANE)

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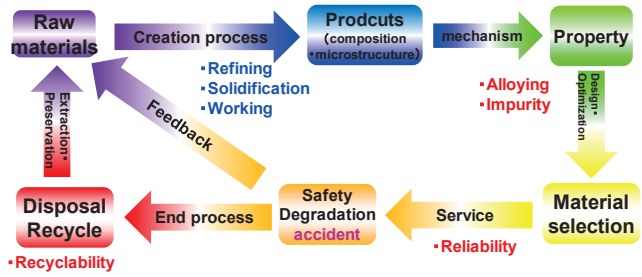
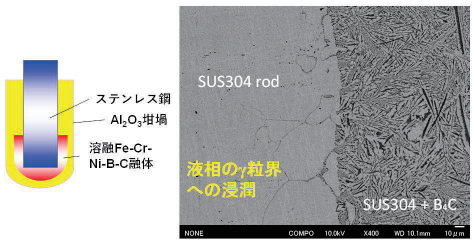
- Safety Metallurgy for Nuclear Systems
- Severe Condition Tolerant Materials
- Safety Decommissioning of Nuclear Reactor
- High Temperature Metallurgical Physical Chemistry
- Metal Production and Recycle Processes

For the long-time operation of the reactor of next generation, control and reduction of impurities are necessary and studied to make fission fuel cladding and reactor pressure vessel highly resistant to heat, pressure and irradiation. Best mix of composition and microstructure are pursued by the development of creation and evaluation process.



Concept of Safety Metallurgy with recycling loop



Research on accessibility for removal of fuel debris in BWR plant after severe accident.

To assess the access root to the fuel debris for its removal from nuclear reactors after severe accident, damage and collapse behavior of structural metals in the reactor core should be well understood and studied through materials reaction experiments. Phase stability of debris and formation behavior of fission products are thermodynamically studied for safe removal and storage of the debris and prediction of condition of RPV during severe accident. On the basis of the active participation to the international project with about 15 countries corporation lead by OECD-NEA as well, "Thermodynamic Characterization of Fuel Debris and FP Products in Fukushima Daiichi Nuclear Power Plant", thermodynamic investigation on cesium compound based material is being promoted with the expansion of international collaboration.

Practical Application of Metallurgy to the Safety Nuclear Engineering is our target.