Particle-Beam Engineering
High Energy Materials Engineering

QR code of Lab. HP

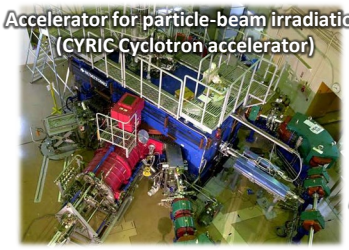


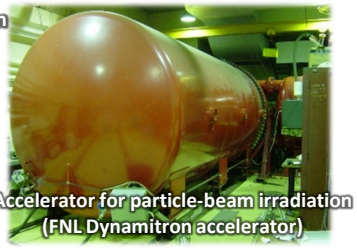
Quantum Science and Energy Engineering

Prof. Akira HASEGAWA, Assoc. Prof. Shuhei NOGAMI, Assist. Prof. Takeshi MIYAZAWA

Through research and development (R&D) of materials used in nuclear systems such as fission and fusion reactors, we aim to contribute to the realization of safe, secure and sustainable nuclear energy.

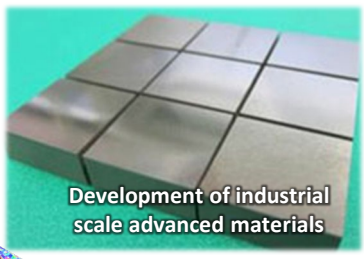
Material behaviors in extreme environments and development of new materials

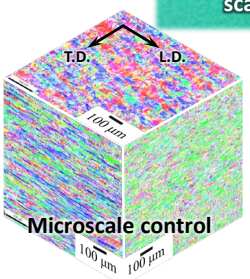


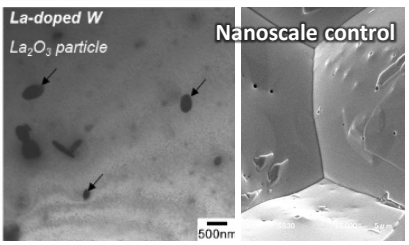


Materials for fission or fusion reactors are used in extreme conditions such as high temperature and high energy particle beam irradiation. We are developing new materials by clarifying the mechanism of material property changes in such extreme environments.

Development of advanced refractory alloys for fusion reactors

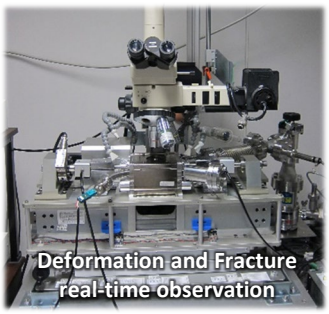


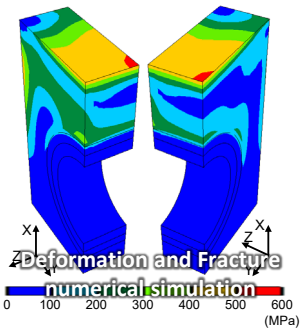




Tungsten is expected as a plasma facing material for fusion reactors. By applying microstructure control methods such as alloying and dispersion strengthening, We are developing advanced tungsten alloys that exhibits superior properties in all aspects such as thermomechanical properties and irradiation tolerance.

Improvement of prediction method for deformation and fracture behaviors



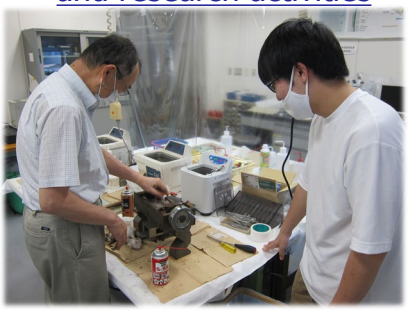


We are studying on technological developments to evaluate and predict the deformation and fracture behaviors of materials expected in actual machines with high accuracy by a complementary approach of experiments and simulations.

International collaboration research

We participate in international collaboration research to conduct the research activities on the world stage.

Balancing anti-COVID-19 and research activities



We provide face-to-face teaching with consideration for anti-COVID-19 measures, and we are proceeding with steady research activities even in the corona vortex.

Research Topics

- Elucidation of changes in the characteristics of structural materials and development of new materials in the extreme environment of nuclear systems
- Development of advanced refractory alloys for fusion reactors

- ✓ If you would like to visit our laboratory, please email to staff-heme@grp.tohoku.ac.jp.
- ✓ The guidance videos are distributed on YouTube. https://www.youtube.com/channel/UCbZSOkQ02FT-onLkyVq0NKA