Mechanical property data on austenitic stainless steels and F82H have been reviewed to discuss for developing structural integrity methodologies of intensely irradiated components such as first walls. The following have been already clarified:

1. Fracture ductility is still high even though tensile rupture elongation is reduced remarkably.
2. Strain-hardening occurs in true stress-logarithmic strain (true strain) relationship. Work-softening behavior observed in nominal stress-nominal strain curves is simply resulted from a reduction of work hardening rate accompanied by the increase of flow stress level by irradiation. The review lead to an innovative design concept for application to intensely irradiated components. A special consideration is given to unique feature of bending moment in developing design methodology for preventing ductile fracture of intensely irradiated materials.

Another discussion is also made on how to simulate mechanical behavior of intensely irradiated components, because mechanical testing of component-wise specimens after intense irradiation is inevitable for the development of design concepts, although irradiation on such a large scale specimen seems to be almost impossible with current irradiation facilities.