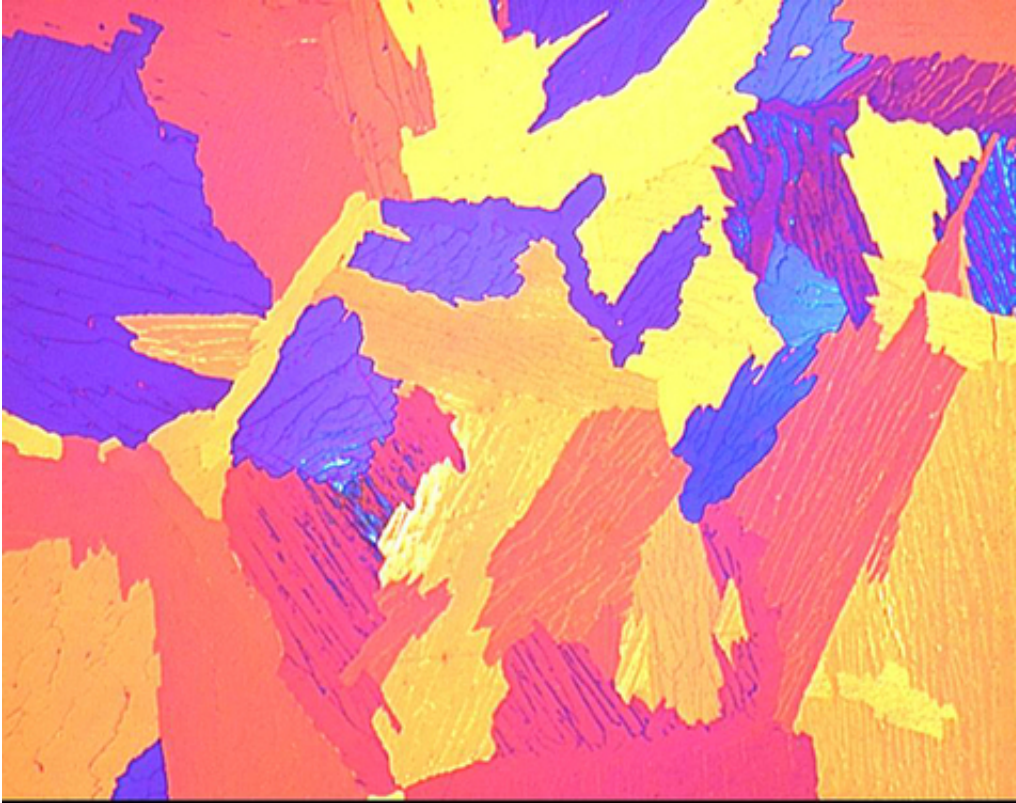


Metallurgy and properties of Zr alloys for nuclear applications

Code référence : 792



OBJECTIFS

Acquire a general view of Zr alloys from the processing to in service properties including safety concerns:

- highlight the main processing parameters affecting the as-received material properties;
- explain the relationship between the microstructure evolution and the physico-chemical and mechanical properties: under irradiation, during corrosion, oxidation and hydriding in light water reactors environment, under accidental scenarii;
- give a reactor feedback and next future trends.

PUBLIC

Qualified engineers, scientists and technicians in charge of fabrication, characterization, application and safety evaluations of Zr based components for nuclear purposes.

Students carrying out specialised studies on materials science and nuclear engineering.

CONTENU

- History and overview of Zr alloys for nuclear applications.
- Processing and forming of industrial components.
- Phase diagrams (includes Zr-H and Zr-O) and control of microstructures (in Zry and Zr-Nb).

- Anisotropy, deformation mechanisms, texture development, mechanical properties.
- Irradiation effects. Effects on microstructure. Creep and growth.
- Mechanical behaviour after irradiation.
- Corrosion in water (without and under irradiation).
- High temperature oxidation and LOCA behaviour.
- Impact of H Pick-up: embrittlement, RIA, post irradiation creep.
- Technical visits.
- Reactor feedback and future trends in design and requirements.

MÉTHODE

Conferences, laboratory visits.

Maximum number of trainees: 25.

COLLABORATION

Adviser: Jean-Luc Béchade (CEA/DEN/DANS/DMN/SRMA). Collaboration: Jean-Christophe Brachet (CEA/DEN/DANS/DMN/SRMA)