

## Qualification of Minor Actinide fuels for fast reactor: fuel design and feedback of irradiation results.

N. Chauvin, M. Phelip, JM Bonnerot, S. Bejaoui.  
Centre de Cadarache, DEC/SESC bat 151,  
13108 SAINT PAUL LEZ DURANCE, FRANCE

### *Abstract*

Two different modes exist for minor actinide transmutation: homogeneous route and heterogeneous route (UO<sub>2</sub> or inert matrix support).

After twenty years of R&D focused on technical feasibility, we can make an analysis based on the main outcomes obtained for transmutation fuel to analyze where we are in the fuel qualification process.

Maturity of each transmutation fuel may be evaluated with a qualification scale. This scale is used for several types of fuel up to industrialization stage.

We have attempted to apply this method to our fuels.

The result is an evaluation of the work to be done in the coming years.

This will be followed by an adjustment of R&D programme until final qualification step with different items: fabrication process, fuel element and sub-assembly design, properties measurements, behaviour modelling and irradiation programme. The irradiation programme shall include analytical, semi-integral and integral irradiations, in MTR or in SFR prototypes in normal conditions as well as for transients and accidental conditions.

It's also necessary to investigate all constraints coming from others analysis, mainly: scenario results, fuel cycle capabilities, reactor limits and others impacts (transport, repository, ...) in order to improve the transmutation fuel design.