

## Application 2061



### **Integration to proposal 2031 "Study of TiO<sub>2</sub> as catalyst for Mg-based materials by powder neutron diffraction"**

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This integration refers to a previous proposal n. 2031.

In order to study the evolution of the sample at high temperatures it is proposed to perform some high temperature PND measurements with temperature rising from RT to 400-500°C. Important information could be obtained with these measurements, in particular deuterium desorption mechanism, phases formation and modification of crystallite sizes and lattice parameters. Being Mg-based materials in the samples in the form of MgD<sub>2</sub>, it is supposed to perform these measurements under vacuum conditions allowing the hydrogen developed to be evacuated from the sample chamber. Otherwise the hydrogen pressure should be kept at lower values respect to the equilibrium pressure in MgD<sub>2</sub> → Mg+D<sub>2</sub> at the maximum temperature reached at the end of the measurement. Periodically neutron diffraction patterns could be acquired during various stages of MgD<sub>2</sub> to Mg phase transformation.