INTRODUCTION

The thermodynamic stability of hydrides is key to practical applications in hydrogen storage. As shown in AN622, we can quantify both the heat of formation of the hydride and its hydrogen sorption capacity. In this example, we demonstrate the capability to make combined calorimetry and sorption measurements on a very small (34mg) sample using the HP cell of a CALVET PRO DSC coupled with a GASPRO.

EXPERIMENT

The reaction of hydrogen with 34 mg of a Mg-C-NbO₃ composite was characterized by:

- PCT measurements to determine the hydrogen uptake,
- calorimetric measurements to study heats of reaction.

The sample was subjected to a series of absorption/desorption cycles. The hydrogen absorption was started at 12 bar, and the desorption was carried out at 1 bar.

RESULTS AND CONCLUSION

We have shown that the absorption reaction is fully reversible and that both the enthalpy and the hydrogen uptake are reproducible throughout the cycles.

This example demonstrates that sorption studies on small quantities of samples can be investigated by this unique coupling of the CALVET PRO DSC and GASPRO.