



	<b>Experiment title:</b> <b>Local order and nanostructure in Al-Y-Fe amorphous alloy</b>	<b>Experiment number:</b> 30-02/780
<b>Beamline:</b> BM30B	<b>Date of experiment:</b> from:12/07/2006 to: 18/07/2006	<b>Date of report:</b>
<b>Shifts:</b>	<b>Local contact(s):</b> Olivier Proux, Jean-Louis Hazemann	<i>Received at ESRF:</i>
<b>Names and affiliations of applicants (* indicates experimentalists):</b> A. Sadoc <sup>1*</sup> , M. Sabra <sup>1*</sup> , O. Proux <sup>2*</sup> , J.-L. Hazemann <sup>2*</sup> , K. S. Bondi <sup>3</sup> , K.F. Kelton <sup>3</sup>  <sup>1</sup> LPMS, Université de Cergy-Pontoise, Neuville sur Oise, 95031 Cergy-Pontoise, Cedex, France <sup>2</sup> CRG-FAME beamline, ESRF, BP 220, 38043 Grenoble Cedex <sup>3</sup> Department of Physics, Washington University, St. Louis, MO 63130, USA.		

The experiments have been reported in an article in press:

Zr and Hf microalloying in an Al-Y-Fe amorphous alloy. Relation between local structure and glass-forming ability

A. Sadoc, M. Sabra, O. Proux, J.-L. Hazemann, K. S. Bondi, K.F. Kelton.

Phil. Mag., accepted august 2008.

### Abstract

The effects of the addition of small amounts of Zr and Hf (0.5 - 3 %) on the atomic structure of Al<sub>88</sub>Y<sub>7</sub>Fe<sub>5</sub> metallic glass were examined from extended x-ray absorption fine structure (EXAFS) experiments to better understand the influence of these microadditions on the glass forming ability of this alloy. Measurements at the Zr K and Hf LIII absorption edges have allowed the local structures around Zr and Hf atoms to be determined. The same Al environment was found for the different concentrations, consisting of a small cluster extending up to 4.5 Å around the Zr atoms and up to 6 Å around the Hf ones. Although the clustering effect is smaller in the Zr neighbourhood, a drastic shortening of the nearest Zr-Al distance is shown, providing evidence for some covalent character to the bonding, in line with the increased glass-forming ability found in the alloys made with the Zr microaddition.