



Experiment title: X-ray surface diffraction on a single grain AlPdMn quasicrystal	Experiment number: SI-351	
Beamline: ID03	Date of experiment: from: 12-02-98 to: 15-02-98	Date of report: 24-02-98
Shifts: 18	Local contact(s): J. Alvarez	<i>Received at ESRF:</i> 02 MAR. 1998

Names and affiliations of applicants (* indicates experimentalists):

M.J. Capitan. ESRF *

J. Alvarez. ESRF *

J.L. Joulaud. ESRF *

Y. Calvayrac

Report:

18 shifts were allocated for the determination of the 5-fold and 2-fold surfaces structure of an AlPdMn quasicrystal single-grain. In order to assure the experiments two series of 5-fold surface samples were prepared. In despite to that, the first series was not adapted for the x-ray surface diffraction due to the apparition of diffuse scattering intensity by annealing the sample at high temperature (above 600C). The presence of this diffusion intensity made almost impossible to distinguish and analysis properly the surface signal. The second series of sample did not present diffuse intensity. However, an incorrect reading of the Cr-Al thermocouple caused the quasicrystal melting during its annealing at a temperature reading of 250C below to the sample melting point. This accident occurred during the annealing previous to starting with the data acquisition and after testing the presence of good surface signal in this sample. The cause of the accident is unknown.

“Anomalous scattering study of the oxide scales formed at high temperature on lanthanum-coated stainless steel”. M.J. Capitan, S. Lefebvre, A. Traverse, A. Paul and J.A. Odriozola, *Acta materialia*, sent.

“Antioxidation protection of stainless steel by lanthanum deposition: advantages of the synchrotron x-rays diffraction for structural studies”. M.J. Capitan, S. Lefebvre, J.P. Dallas and J.L. Pastol. *Surface and coating technology*. Accepted.

“A new high temperature furnace for “in situ” x-ray diffraction studies”. M.J. Capitan, G. Rostaing, N. Thouin, J.L. Joulaud and S. Lequien. *Appl. Crystal.*, sent.

Stress determination by x ray diffraction in quasicrystalline-based AlCuFe coatings, C. Diot, T. Ochin, J.L. Joulaud, *Proceedings of the International Conference of Residual Constraint, 1997, Linkoping, Suede.*

“Volume and grain boundary self diffusion of Fe in AlCuFe icosahedral quasicrystals”, J.L. Joulaud, C. Bergman, J. Bemardini, P. Gas, J.M. Dubois, Y. Calvayrac et D. Gratias, *Phil. Mag. A*, 75,1997,1287-1297

“Structural analysis of quasicrystalline coatings obtained by cathodic sputtering”, J. L. Joulaud, C. Diot et P. Dormadieu, *Proceeding of the 5th Conference on Quasicrystals*, editors: C. Janot et R. Mosseri (World Scientific, Avignon, 1995), p. 726.