ESRF	<b>Experiment title:</b> Phase separation and N clustering in low-content Indium InGaAsN: an investigation of the Indium threshold by EXAFS in fluorescence mode	Experiment number: 08-01-634
Beamline:	<b>Date of experiment</b> : from: 09/07/2003 to: 13/07/2003	<b>Date of report</b> : 12/08/2004
Shifts:	Local contact(s):	Received at ESRF:
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## **Report:**

The present work has been published on **Physical Review B**, Rapid Communications.

## Full reference details:

G. Ciatto, F. D'Acapito, L. Grenouillet, H. Mariette, D. De Salvador, G. Bisognin, L. Floreano, R. Gotter, S. Mobilio and F. Boscherini, "A quantitative determination of short range ordering in  $In_xGa_{1-x}As_{1-y}N_y$ ", *Physical Review B* **68**, 161201(R) (2003).

## Abstract:

Short range ordering in the form of an excess of In - N bonds with respect to the random case has been recently predicted for the dilute nitride alloy In<sub>x</sub>Ga<sub>1-x</sub>As<sub>1-v</sub>N<sub>v</sub>. This ordering induces a blue shift of the optical band gap and could represent a fundamental materials limitation. In this report we provide the first quantitative determination of the effect of annealing on the short range ordering in In<sub>x</sub>Ga<sub>1-x</sub>As<sub>1-v</sub>N<sub>v</sub>, using X-ray absorption spectroscopy and state-of-theart analysis methods. We find that in annealed samples short range ordering is weak, one order of magnitude smaller than predicted.

## Other publications related to this experiment:

- 1) G. Ciatto and F. Boscherini, "Local structure in dilute nitrides probed by X-ray absorption spectroscopy", J. Phys.: Condens. Matter 16, S3141 (2004).
- 2) G. Ciatto, F. Boscherini, F. d'Acapito, D. De Salvador, D. Batchelor, R. Carboni, L. Grenouillet, H. Mariette and S. Mobilio, "Lattice location of N in In<sub>x</sub>Ga<sub>1-x</sub>N<sub>y</sub>As<sub>1-y</sub> dilute nitrogen alloys", *Physica Scripta*, in press.