Strain, Size and Composition of Buried GaN Quantum Dots in AlN Using Grazing Incidence Anomalous Diffraction

Vincent Favre-Nicolin[a,b], Johann Coraux[a], Hubert Renevier[a,b], Maria Grazia Proietti[c], Jean-René Regnard[a,b], Bruno Daudin[a], [a]*Commissariat à L'Energie Atomique, DRFMC/SP2M/NRS, 17 rue des martyrs, 38054 Grenoble Cedex 9, France.* [b]*Université Joseph Fourier, BP 53, 38041 Grenoble Cedex 9.* [c]*Universidad de Zaragoza, calle Pedro Cerbuna 12, 50009 Zaragoza, Spain*. E-mail: Vincent.Favre-Nicolin@cea.fr

Structure determination of buried nano-structures represents a challenge due to (i) the nanometric scale of objects and (ii) the presence of strain fields, which produce a 3D (non-discrete) diffuse scattering.

We have developped the use of grazing-incidence multi-wavelength anomalous scattering, which allows to extract the scattering contribution of the (resonant) atoms only. By targetting the resonant edge of one atom of the nano-structures, it allows solving the sub-structures of the nano-objects without requiring any model or prior information.

We will show how this technique can be used to extract the sub-structure of GaN Quantum Dots (QD) in AlN, to obtain the size and strain of QD as a function of the number of layers of QD deposited.

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