Réunions scientifiques

Séminaires

X-ray spectro-microscopy: recent applications in semiconductors

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Amphithéâtre SOLEIL – Bâtiment Central

Based on the scanning synchrotron radiation microprobe ID22 of the European Synchrotron Radiation Facility, the talk involves two parts: first, the characterization of diluted magnetic semiconductors especially potentials for spintronics; and secondly, the introduction of an imaging tool in the hard x-ray microscope to analyze optical inhomogeneities with site and chemical selectivity.

1) In GaMnN alloys, a combination of fluorescence mapping with spectroscopic techniques enabled us to examine not only the Mn valence states but also the crystallographic orientation at the micrometer scale. The strong polarization-dependent x-ray absorption near-edge structure features showed the preservation of the hexagonal GaN structural order. In ZnCoO films, the microanalysis revealed the homogeneous incorporation of Co atoms with tetrahedral coordination, corresponding to a substitutional site in the wurtzite ZnO structure.

Finally in GaGdN, X-ray linear dichroism reflected the strong anisotropy of the unoccupied density of states, exhibiting the unambiguous signature of the hexagonal GaN matrix. Within the experimental accuracy, a predominantly trivalent Gd state was found accompanied with no local atomic distortion as a function of Gd fractions.

2) Expanding the microscope versatility, the details of the optical fiber system incorporated for x-ray excited optical luminescence acquisitions will be described. The especial technical design allowed several studies on local electronic structure at the micrometer scale with a flexible access for multiple detection modes. Optical images of the radiative recombination channels are reported for several impurities and defect centers in sapphire and GaN compounds. Also, data collections from InAs quantum heterostructures which support the excellent performance of the novel device are shown.

Formalités d'entrée *: accès libre dans l'amphi du Pavillon d'Accueil. Si la manifestation a lieu dans le Grand Amphi Soleil du Bâtiment Central, merci de vous munir d'une pièce d'identité (à échanger à l'accueil contre un badge d'accès).*

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