

Emission Channeling Studies in Dilute Magnetic Semiconductors: Transition Metal doped ZnO and GaN

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Magnetically doped semiconductors (dilute magnetic semiconductors - DMS) are seen as strong candidates to make use of the carriers spin in spintronic devices. Latest results of both experiment and theory are driving the research focus towards wide-gap semiconductors doped with 3d transition metals. However, any attempt to understand the room temperature ferromagnetism observed in these systems, something which still remains far from being accomplished, must start from a detailed structural understanding of the systems, in particular a quantitative knowledge of the (magnetic) impurities lattice sites.

We present preliminary analysis of recent emission channeling experiments on the lattice location of implanted Fe (off-line experiments) and Co and Mn (on-line experiments) in wurtzite ZnO and GaN. Together with some results on the magnetic properties, by means of SQUID magnetometry, and structural (disorder) characterization, by means of Raman spectroscopy, these experiments pave the way for the research to follow.

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