

Abstract Submitted
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Control of selforganized magnetic nanocrystals aggregation in (Ga,Fe)N by co-doping with shallow donors and acceptors A. BONANNI, A. NAVARRO-QUEZADA, T. LI, Johannes Kepler University, Linz - Austria, M. KIECANA, M. SAWICKI, T. DIETL, Institute of Physics, PAS - Warsaw — A number of possible room temperature functionalities has recently been proposed for magnetically doped semiconductors, in which spinodal decomposition leads to the self-organized formation of coherent ferromagnetic nanodots or nanocolumns [1]. It has also been suggested that the decomposition can be controlled in a wide range by growth conditions and co-doping [2]. We have extended our previous structural and magnetic studies of (Ga,Fe)N [3] by examining the effects of Si and Mg co-doping. As before, we have found the magnetic response to consist of a paramagnetic signal from substitutional Fe and of a ferromagnetic component due to Fe_{1-x}N nanocrystals. Our results demonstrate that the co-doping reduces the fractional concentration of Fe contributing to the nanocrystals. This shows that tuning of the Fermi energy by changing the charge state of the transition metal ions affects their aggregation, as proposed recently [2].

1. H.Katayama-Yosida et al., *phys.stat. sol. (a)* 204, 15 (2007); T.Dietl, arXiv:0711.0343. 2. S.Kuroda et al., *Nature Mat.* 6, 440 (2007). 3. A.Bonanni et al., *Phys. Rev. B* 75, 125210 (2007).

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