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### **Control and properties of magnetic nanostructures in nitride semiconductors**

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We review [1] studies of MOVPE (Ga,Fe)N [2-7] and (Ga,Mn)N [8,9], combining magnetic [2-4,6,8,9], magneto-optical [3], and XANES [4,5,8] investigations with a comprehensive structural and chemical characterization by SIMS, TEM, EDS [2,4,6,8,9], synchrotron-XRD [4,6,8], EXAFS [5,8], and PEEM [7]. We show that the Fe ions aggregate into  $\text{Fe}_x\text{N}$  nanocrystals either by crystallographic or by chemical phase separation, controlled by the growth conditions and by co-doping. Depending on the degree of nitridation, these nanocrystals are either ferromagnetic or antiferromagnetic.

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