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Synthesis and electronic and magnetic properties of size and shape tunable Indium Nitride nanoparticles BASUDEB CHAKRABORTY, Graduate Student, REMI BEAULAC, Professor/faculty — The basis of III-V semiconductor's functionality which plays a fundamental role in many of the technologies transforming everyday life, arises from a combination of distinctive properties such as high carrier mobility, highly favorable optoelectronic properties. Though there are numerous reported schemes to synthesize high quality II-VI semiconductor nanomaterials, efficient synthetic method to produce highly crystalline, monodispersed colloidal III-V semiconductor nanomaterials is still a handful. Here, wurtzite indium nitride (InN) nanocrystals have been synthesized with narrow size distribution, good crystallinity and reasonable amount of emissivity via a solution route using commercially available, inexpensive and easy to handle precursors. Quantum confinement in these InN nanocrystals is demonstrated and the band-gap (0.69 eV in bulk) is quantitatively correlated to the size of the nanoparticles. The size, shape and dispersity of the nanoparticles can be tuned by controlling the molar ratio of substrates and surfactants and rate of addition of the reactants. These nanocrystals doped with transition metals such as Manganese (Mn), Cobalt (Co) are expected to influence the electronic structure and magnetic properties of the material.

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