

# Curie Temperature in cobalt doped GaN Half metal Ferromagnet : Heisenberg model and GGA Study

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GaN is a non-magnetic 2D material with an indirect gap of 1.995 eV, based on this compound we can fabricate new dilute magnetic semiconductor to meet the need for small spintronic devices, To achieve this we investigate the electronic and magnetic properties of the GaN monolayer doped with Co using the Generalized Gradient Approximation (GGA). Our investigation employed the full potential-linearized augmented plane wave method (PP-PW) within the framework of Density Functional Theory (DFT), as implemented in the CASTEP code. We note the ferromagnetism effect and semi-metallicity in the Co doped GaN monolayer due to the double exchange mechanism. Our compound is robust ferromagnet and exhibits a high spin polarization. Tc is estimated using the Heisenberg model in the mean field approximation.