

## Cr Induced Magnetization in Zinc-Blende ZnO-Based Diluted Magnetic Semiconductors

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**Abstract :** The capability of exploiting the electronic charge and spin properties simultaneously in a single material has made diluted magnetic semiconductors (DMS) remarkable in the field of spintronics. We report the designing of DMS based on zinc-blend ZnO doped with Cr impurity. The full potential linearized augmented plane wave plus local orbital FP-L(APW+lo) method in density functional theory (DFT) has been adapted to carry out these investigations. For treatment of exchange and correlation energy, generalized gradient approximations have been used. Introducing Cr atoms in the matrix of ZnO has induced strong magnetic moment with ferromagnetic ordering at stable ground state. Cr:ZnO was found to favor the short range magnetic interaction that reflect the tendency of Cr clustering. The electronic structure of ZnO is strongly influenced in the presence of Cr impurity atoms where impurity bands appear in the band gap.

**Keywords :** ZnO, density functional theory, diluted agnetic semiconductors, ferromagnetic materials, FP-L(APW+lo)

**Conference Title :** ICAM 2015 : International Conference on Advanced Materials

**Conference Location :** Jeddah, Saudi Arabia

**Conference Dates :** January 26-27, 2015