マテリアルサイエンス系セミナー（第5回）

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Cost effective green synthesis of silver nanoparticles using plants leaf extracts and numerical calculation of magnetic state and Curie temperature in transition metal doped semiconductors

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日　時：平成29年7月21日（金）15：00～16：30

場　所：マテリアルサイエンス系研究棟4棟8階　中セミナー室

講演要旨：

Silver nano particles have been synthesized using plant's leaf extract method. This method is simple, cost effective, rapid, one step, eco-friendly and non-toxic. Variation of the size of the silver nano-particles have been investigated considering temperature, concentration of silver nitrate and reaction time.

Stable magnetic state in the transition metal (TM) doped zincblende (ZB) type compounds $(Al_{1-x}M_x)Sb$ and $(Ga_{1-x}M_x)As$ are investigated on the basis of density functional theory, where M is the 3d TM atom namely Ti, V, Cr, Mn, Fe, Co, Ni and x is the fractional concentration of M. The electronic states and magnetic properties are calculated using the first-principles self-consistent Korringa-Kohn-Rostoker (KKR) Green's function method combined with the coherent potential approximation (CPA). Some of the calculated properties of ZB type materials $(Al_{1-x}M_x)Sb$ and $(Ga_{1-x}M_x)As$ exhibit stable ferromagnetic (FM) states relative to a corresponding disorder local moment (DLM) states. The total energy difference between FM and DLM states per unit cell is used to estimate their Curie temperature (T_C) within the mean-field approximation. The calculated T_C in Mn, and Cr doped cases are found to be above the room temperature (RT), whereas in Ti, and V doped cases T_C remain below the RT. In addition, T_C increases with doping concentrations in a range of dilute limit (x = 20%) of magnetic atoms. On the other hand, Fe, and Co doped materials exhibit FM instability due to the dominating super-exchange interaction over the FM one.

講演者略歴：

1988-1992　Bachelor of Science (Honours) in Physics, Grade: First class University of Dhaka, Dhaka
1993-1994　Master of Science (in Solid State Physics), Grade: First class University of Dhaka, Dhaka
1995-1998　Department of Physics, Bangladesh University of Engineering and Technology (BUET)
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参加申込・予約は不要です。直接会場にお越しください。

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