Structural and magnetic properties of transition metal doped semiconducting nanomaterials and Photocatalytic Degradation of Methylene Blue by using ZNS/CNT Nanocomposites under Visible Light

Dr. Sushil Kumar Jain

Manipal University Jaipur, Deputy Director (Alumni Relations)

"Nanotechnology involves the miniaturization of devices into nanometer sizes where the ultimate performance is enhanced dramatically. Nanomaterials typically exhibit unique Magnetic, optical, and photocatalytic properties compared to their bulk counterpart and even molecular complements. Semiconductor nanoparticles are a very important topic in on-going research activity across the world. Zinc oxide is attracting tremendous attention due to its interesting properties like wide direct band gap of 3.3 eV at room temperature and high exciton binding energy of 60 meV. Zinc oxide is widely used in a number of applications like photocatalysis, gas sensors, varistors, low-voltage phosphor material and so on. Tin dioxide (SnO_2) is one of the most important semiconductor with a wide band gap (Eg = 3.6 eV at room temperature). It belongs to a class of materials that combines high electrical conductivity with optical transparency and thus constitutes an important component for optoelectronic applications. Moreover, 3d metal substitute ZnO and SnO_2 have a lower cost when compared to actually available materials for similar applications. The present talk will focus on our recent work for the photocatalytic degradation of Methylene Blue from aqueous solution using ZNS/CNT photocatalyst under visible light. In addition, the future collaboration between our group and Hiroshima University will also be proposed for energy storage application."