**Preparation of Surface surrounded Fe2O3 (core) / TiO2 (shell) Nanocomposites for Solar Hydrogen generation by Photoelectrochemical Splitting of Water**

Shailja Sharma, Babita Kumari, Anuradha Verma, Vibha R Satsangi1, Sahab Dass and

Rohit Shrivastav**\***

Department of Chemistry, Dayalbagh Educational Institute,

Dayalbagh, Agra-282 005, India

1Department of Physics & Computer Science, Dayalbagh Educational Institute,

Dayalbagh, Agra-282 005, India

\*Author for correspondence: rohitshrivastav\_dei@yahoo.co.in

**Abstract**

Hydrogen-based energy technologies are expected to play a substantial role in meeting future energy demands. Water-splitting photoelectrochemical (PEC) cells offer such a possibility to harness abundantly available solar energy and convert it to a directly usable chemical form. This study deals with the synthesis, characterization and use in PEC splitting of water of sol-gel derived Fe2O3–TiO2 core shell nanocomposites. The Fe2O3 (core)/TiO2 (shell) nanocomposites were synthesized by modified Stöber method, which were employed by using two different concentrations of tetrabutyl orthotitanate (TBOT, the precursor used for generating TiO2 coat over Fe2O3) and characterized by X-ray diffraction analysis, UV-Visible optical absorption and Surface morphology was investigated by SEM analysis. XRD analysis revealed dominant evolution of Fe2O3 (hematite phase) at the core on to which TiO2 (anatase) was coated. The average crystallite size, estimated from Scherrer’s computations was 45-55 nm. PEC studies indicated that core shell composites offer significant photocurrent. The effect of variation in concentration of titanium (IV) butoxide (precursor used for generating TiO2 coat over Fe2O3) was also investigated.

***Key Words:***  Solar-Hydrogen; Core-Shell Nanocomposites; Photoelectrochemical; Water splitting; TiO2; Fe2O3