

# Seminar

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## Institute for Plasma Research

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**Title :** High-Performance Supercapacitors for Future Practical Applications with Zinc Ferrite Anchored Multi-Walled Carbon Nanotubes

**Speaker:** Dr. Subrata Pradhan  
Institute for Plasma Research, Gandhinagar

**Date :** 2nd April 2018 (Monday)

**Time :** 03.30 PM

**Venue :** Seminar Hall, IPR

### **Abstract :**

In recent times, thin film supercapacitors have attracted huge practical interest as they can achieve both high energy and power density for several applications of societal, environmental, engineering and strategic origins. Supercapacitors are best suited to applications requiring energy pulses during short periods of time e.g. seconds or tens of seconds. These are recommended for high speed automobiles, tramways, buses, cranes, forklifts, wind turbines, electricity load leveling in stationary and transportation systems etc. We have experimentally realized thin film supercapacitors consisting of zinc ferrite ( $ZnFe_2O_4$ ) anchored multiwall carbon nano-tubes (CNT) employing a simple and inexpensive 'successive ionic layer adsorption and reaction (SILAR)' method. This method has the advantage of direct electrode formation without the use of any binder. The synergy of composite electrode ( $ZnFe_2O_4$ -CNT) yields a high specific capacity of 217 mA.h/g at 5 mV/s. This is being realized by the contributions from the inner and outer active surfaces of the  $ZnFe_2O_4$ -CNT hybrid electrode. Additionally, the solid state symmetric device exhibits a highest specific energy of 12.80 W.h/kg and specific power of 377.86 W/kg; which clearly demonstrates that our hybrid  $ZnFe_2O_4$ -CNT electrode is promising and innovative for energy storage device application of future.

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