

CERTIFICATE

This is to certify that the project report entitled “**Designing and Fabrication of Plasmonic Solar Cells by Incorporating Metal Nanoparticles**” which is being submitted by **Mr. Nishu Gupta (Enrollment No. 2K9/MT/FT/NST/11)** to “**Department of Applied Physics, Delhi Technological University, Delhi**” for the award of degree of **Master of Technology (NanoScience and Technology)** is a record of bonafide work carried out by him under our supervision.

The project work has been carried out from 7th February to 14th June 2011.

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STUDENT'S DECLARATION

I hereby certify that the work which is being presented in this project report entitled “**Designing and Fabrication of Plasmonic Solar Cells by Incorporating Metal Nanoparticles**” submitted to the Department of Applied Physics, Delhi Technological University in fulfillment of the requirement of the degree of **Master of Technology (NanoScience and Technology)** is an authentic record of my own work. I have not submitted the matter embodied in this dissertation for the award of any other degree elsewhere.

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ABSTRACT

This dissertation gives a comparison of photovoltaic performance of bulk heterojunction solar cell using blends of poly (3-hexylthiophene) (P3HT) and [6,6]-phenyl-C61-butyrac acid methyl ester (PCBM) with the ZnS doped P3HT and PCBM blends incorporating polyaniline nanotubes using common organic solvents and spin coating technique. ZnS nanoparticles were synthesized by aqueous method. Prior to these processes, fabrication and designing of solar cells, right from the initial steps such as patterning of ITO coated glass, etching, cleaning and subsequent processes were performed.

Characterization with AFM and SEM show particles are monodisperse and spherical in shape. The blue shift of optical adsorption edge indicates the formation of particles in nanometer regime.

The main advantages of such cells are easy preparation, low process temperature, low cost materials & processing technology and the possibility to produce flexible devices on plastic substrates. Such flexible cells are therefore candidates for gamut of applications, from handheld electronics to commercial power production.