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Abstract

# Advanced Ag/rGO/$TiO_2$ Ternary Nanocomposite based Photoanode Approaches to Highly-Efficient Plasmonic Dye-Sensitized Solar Cells

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## Abstract:

This researchdemonstrates the utilization of newlydesignedadvanced Ag/rGO/$TiO_2$ternary nanocomposite based photoanode for highly-efficient plasmonicdye-sensitizedsolarcells (PDSSCs). The Ag/rGO/$TiO_2$ternary nanocomposite wassuccessfullysynthesized by a facile solvothermalapproach without deploying any hazardous agent. In order to achieve the higher power conversion efficiency of the PDSSCs, itis essential to improve the electron injection and optical absorption of the photoanodes. The nanocomposite wascharacterized by FE-SEM and TEM analyses, whichdisclosedthat the ternary nanocomposite has been synthesized. The incorporation of Ag nanoparticles on the $TiO_2$nanoparticlesconsiderablyinfluenced the opticalpropertiesbecause of the localized surface plasmonresonance. XRD and EDX spectroscopic techniques wereutilized to confirm the synthesis of Ag nanoparticles and rGO. Furthermore, thermal stability of the nanocomposite wasinvestigated by thermal gravimetricanalysis (TGA). Ag/rGO/$TiO_2$ternary nanocomposite based photoanode demonstrated an enhanced power change productivity of 6.87% in PDSSCs, whichwas 15% higherthanthat of the unadulterated $TiO_2$nanoparticlesbased photoanode. In addition, an enhanced IPCE of 68% wasalsoobserved in comparisonwith the pristine $TiO_2$, whichwasfound due to remarkableconductivity of rGO

## Biography:

Hafiz Muhammad Asif Javed, COMSATS University Islamabad, Sahiwal Campus, Pakistan is Submitted his abstract on the conference on Frontiers in Nanotechnology and Nanomaterials; May 04-05, 2020; Vienna, Austria.

## Recent Publications:

1. Hafiz Muhammad Asif Javed; Structural, Vibrational, Mechanical and Optoelectronic Properties of LiBH4 for Hydrogen Storage and Optoelectronic Devices: First Principles Study, 2020.
2. Hafiz Muhammad Asif Javed; Strategic Design of Cu/TiO2-based Photoanode and rGO-Fe3O4-based Counter Electrode for Optimized Plasmonic Dye-Sensitized Solar Cells,2020.
3. Hafiz Muhammad Asif Javed et al; Structural, spectral, dielectric and magnetic properties of indium substituted copper spinel ferrites synthesized via sol gel technique, 2020.
4. Hafiz Muhammad Asif Javed et al; Designing of non-fullerene 3D star-shaped acceptors for organic solar cells, 2019.
5. Hafiz Muhammad Asif Javed et al; Investigation on the Surface Modification of TiO2 Nanohexagon Arrays Based Photoanode with SnO2 Nanoparticles for Highly-Efficient Dye-Sensitized Solar Cells, 2018.

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