GLOBAL E-CONFERECE ON
CHEMISTRY AND CHEMICAL ENGINEERING
APRIL 05-06, 2023 | WEBINAR

Dr. Mohammad Ehtisham Khan

Department of Chemical Engineering Technology, College of Applied Industrial Technology, Jazan University, Jazan, 45142, Kingdom of Saudi Arabia

Nanostructured Materials for Energy and Environmental Applications: A Sustainable Approach

The concept of environmentally sustainable/green chemistry focuses on the reduction, recycling or removal of toxic chemical compounds in various fabrication processes by creating creative, alternative routes for fabrication of the desiredproducts with a reduced impact on the environment and human health.Eco-friendly green alternatives to conventional chemistrypractices are made possible by green chemistry. Development of environmentally friendly synthesis methods is vital to the expansion of visible light-induced applications in energy and environment. In many cutting-edge technological areas, notable research efforts are currently aimed at making efficient, economical, and green sources of nanoparticles for applications that depend upon well-defined composition, size, and morphology. Developing biofilms from a single strain is a promising techniquefor fabricating carbon-based metal nanostructures. Generally, different types of micro-organisms form biofilms on solid surfaces for mutual benefit. In this study, a biofilm was produced using the microorganism Shewanella oneidensis, which is an electrochemically active microbe. The biofilm can be used to control chemical/biological reactions and bioremediation. The effects of small amounts of gold nanoparticles (AuNPs) (1 mM, 3 mM, and 6 mM) anchored successively onto sheet-like structures of graphitic carbonnitride (g-C3N4) to improve the visible-light absorption performance and separatethe photogenerated electron–hole pairs were studied.The as-fabricated nanostructures exhibit improved photocurrent performance when irradiated with visible light. On the basis of the SPR effect of AuNPs, low band gap energy, excellentvisible light absorption, and superior photocurrent generation, it was demonstrated that the photoelectrochemical performance of AuNPs was superior. The charge transferproperties in the Au-g-C3N4nanostructures highlightits potential as good qualityplasmonic-based electronic materialfor energy storageand conversion applications for real device fabrication.

Keywords: **Green synthesis, carbon-based nanostructures, Photocatalysis, Photoelectrochemical**

Biography:

Dr. Mohammad Ehtisham Khan, Presently working as an AssistantProfessor and Head of the Department in Chemical Engineering Technology at Jazan University, Kingdom of Saudi Arabia Dr. Khan obtainedPhD in ChemicalEngineering from YeungnamUniversity, the Republicof Korea. He is workingin the cutting-edge area of nanosciences and nanotechnology, especially inorganic materials, such as,the fabrication of metal-metal oxides and carbon-based nanostructures for variousnovel applications in the field of energy,environment, and biological applications, The fabricated nanostructured materials effectively applied for the catalysis, photocatalysis, photoelectrodes, optoelectronic devices, hydrogenproduction, sensing, and selected biological applications. Dr. Khan has publishedseveral research and review articlesin peer-reviewed international journals of Royal Society of Chemistry (RSC),American Chemical Society(ACS), Elsevier, Nature,Nature Springer etc. He has edited severalbooks for Elsevierand has contributed more than twenty book chapters.

doi.org/10.51219/URForum.2023.Mohammad-Ehtisham-Khan ISBN-978-1-7393132-7-2