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Photodynamic cancer therapy of $Ag@ZrO_2$ core-shell nanoparticles *in vitro*

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Photodynamic Therapy (PDT) is one of the emerging treatment modalities for cancer that takes the advantage of the interaction between light and a photosensitizing agent to initiate cell death. In the present work, core-shell type Ag@ZrO2 nanoparticles were prepared by one pot simultaneous reduction of AgNO3 and hydrolysis of Zr (IV) isopropoxide. They were characterized by absorption, XRD, HR-TEM and EDAX techniques. XRD patterns show the presence of monoclinic ZrO2 and the noble metal (Ag). HR-TEM measurement revealed that their size is below 50 nm. EDAX studies show that coating of ZrO2 on the metal surface. The photohemolysis studies carried out under two different experimental conditions in human erythrocytes, shows that the photohemolysis increases with concentration as well as light dose. The study of the effect of scavengers, GSH and NaN3 showed the formation of the considerable amount of Reactive oxygen species (ROS). The mechanism has been discussed. The photogeneration of singlet oxygen was confirmed by ESR technique. The cell viability of HeLa cell lines studied using MTT assay method, indicates the requirement of low light dose with increase in concentration. The above results confirm that Ag@ZrO2 core-shell nanoparticles can very well be used as nanophotosensitizer for PDT in the place of conventional organic photosensitizers.

Biography

K S Meena is working as Associate Professor of Chemistry & Controller of Examination, and also acts as the Co-ordinator of Bioinformatics Infrastructure Facility Centre in Queen Mary's College, Tamil Nadu, India.

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