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Preparation of some metal oxides nanoparticles using chitosan as template

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Chitosan (CS) was included in the preparation of different metal oxides nanoparticles by using a modified sol-gel technique to improve the morphology of the obtained nanoparticles. Titanium oxide (TiO₂) and Zirconium oxide (ZrO₂) nanoparticles have been prepared separately in presence of CS and/or Palladium (Pd). Similar experiments were conducted in absence of CS to evaluate its impact on the nanoparticles morphology and the obtained nanoparticles have been characterized with XRD, TEM, UV/Vis, PI and BET techniques. The results revealed that CS can effectively prevent the agglomeration of the nanoparticles in both cases of TiO₂ and ZrO₂ and the nanoparticles are distributed in homogeneous domains within the matrix. Photo catalytic activity was investigated under visible light irradiation by using methylene blue (MB) and thiophene (TH) as model pollutants for TiO₂ and ZrO₂, respectively. UV-Vis spectroscopic investigation demonstrated that the composite's ability to absorb visible light is greatly improved which is reflected on its efficacy to degrade the organic pollutants used. Recycling experiments confirmed the relative stability of the catalysts. They were reproducible without significant loss in their activity during the first five cycles.

Biography

Magdy Y Abdelaal obtained his PhD in 1991 from Mansoura University, Egypt in collaboration with FU-Berlin, Germany. He is a Professor of Polymer Chemistry at Mansoura University and at KAU, Saudi Arabia on sabbatical since 2004. He has cross-cooperation with many institutions including NIMC and Toyohashi University of Technology, Japan; LNF/INFN, Italy and most institutions in Egypt. He has published 45 papers in reputed journals and served as a reviewer for many international journals. His research focuses on polymers and their nano-composites in wastewater treatment, polymer recycling, pharmaceutical and biomedical applications and as templates for photonanocatalysts preparation.

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