



				البحث الرابع
Silver imprinted zinc oxide nanoparticles: Green synthetic				عنوان البحث
approach, characterization and efficient sunlight-induced				
photocatalytic water detoxification				
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Abstract: Unique and infrequent strategy to greenly synthesize silver imprinted zinc oxide nanoparticles (AgZnO NPs) is presented. A facile and low cost phytosynthetic route using guava leaves aqueous extract succeeded in decorating commercial ZnO with Ag nanoparticles without needing environmentally undesirable chemical reagents. The AgZnO NPs were characterized by X-ray diffraction (XRD), Fourier transform infrared (FTIR), ultraviolet/visible (UV/Vis) spectrophotometry/spectrofluorimetry, scanning electron microscopy (SEM) and transmission electron microscopy (TEM). Band gap calculations of Ag(2.5mol%)/ZnO give estimate of (3.03 eV) compared to 3.25 eV for ZnO. indicating good capacity of visible light absorption. This improves the solar energy harvesting characteristics of the phyto-developed AgZnO NPs. Moreover, the photocatalytic efficacy of AgZnO NPs is tested in detoxification of methylene blue (MB) enriched aqueous solutions. Parameters affecting the photodegradation rate like catalyst dosage, amount of Ag loading and pH were investigated and optimized. Under  $\approx 18$  min of sunlight-irradiation (800 W/m<sup>2</sup>), over 22 mg/L of alkaline solution of MB can be efficiently photomineralized using 0.4 g of Ag(2.5%)/ZnO NPs. Under the optimized conditions, the developed photocatalysts show a great stability after 6 folds of photocatalytic cycles reflecting their efficient photocatalytic performance in the long run.