Green synthesis of zinc oxide nanoparticles using tomato (*lycopersicon esculentum*) extract and its photovoltaic application

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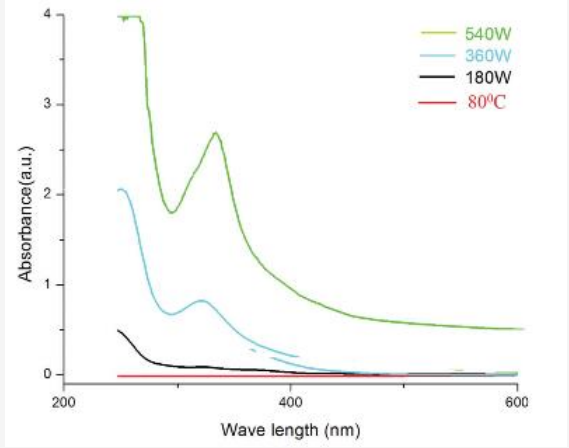
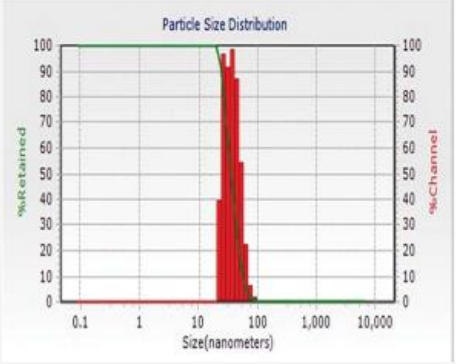
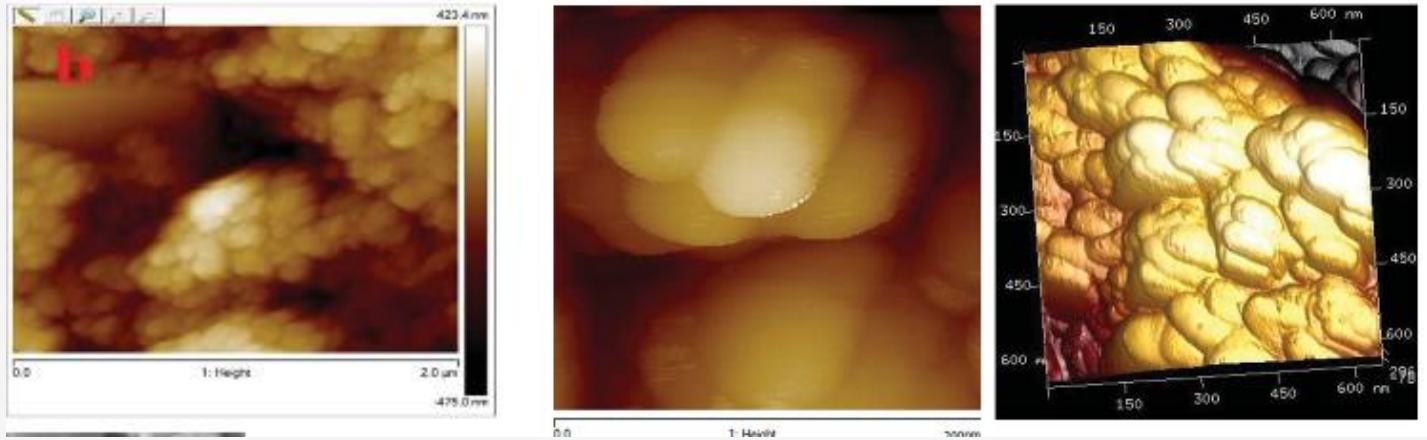
Zinc oxide nanoparticles were obtained through wet chemistry reduction of zinc nitrate using tomato extract as a reducing and stabilizing agent. The precursors were treated using microwaves at different powers to achieve the synthesis. AFM measurements were used to determine particle size and morphology using a AFM multimode V8.



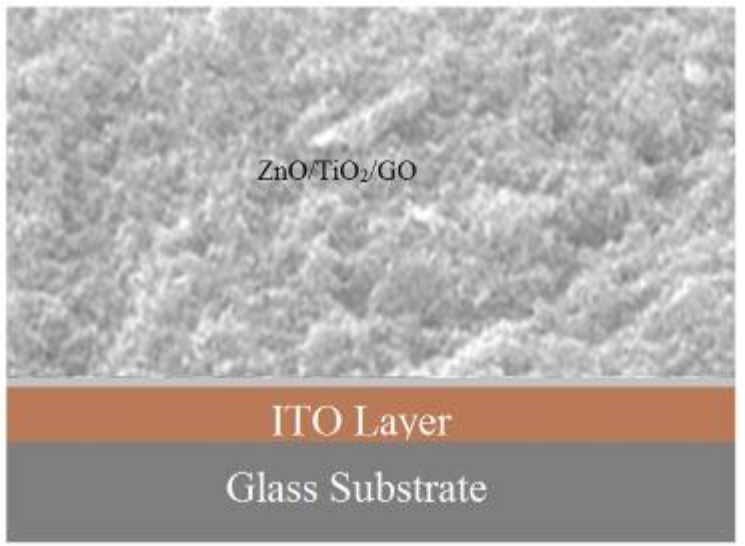
Particles synthetized at different microwave Powers showed significant difference on their UV-vis spectra. Being 540W the best condition for synthetizing ZnO nanoparticles



Size dispersion of the particles was calculated using dynamic light scattering (DLS) analysis



Zinc Oxide nanoparticles size and morphology were determined using Atomic force microscopy. The simples treated at 540W showed a mean size of 70 nm in DLS, this was confirmed with AFM (left). The nanoparticles showed a mostly spherical morphology. When mixed with the TiO2 and the Graphene oxide slurry AFM was used to analyze the distribution on the thin film which was homogenous and without agglomeration of the nanoparticle(right and center), the resulting thin film was tested as a photovoltaic cell showing a power conversion efficiency of 6.18%.



ZnO nanoparticles were used to create a TiO2-Graphene oxide slurry that was deposited over ITO covered glass for the design of a photovoltaic cell

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