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Tin doping effects on ZnO thin films and ZnO nanostructures for gas sensors applications

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Doping the transparent conductor oxide ZnO with tin Sn is an efficiency technique to enhance and control the electrical and optical properties of ZnO thin films and ZnO nanostructures. The most known practical application is to be used as sensors for many harmful gas pollutants our human life and our environment. Sn-ZnO with different dopant concentration were prepared using spray method. Owing to spectroscopic and microscopic analysis techniques such as XRD, EDX, SEM, XPS and TEM, (see figures) we show that the concentration increases the number of grain by surface units and then diminishes the grain sizes. These results might be of great interest for gas sensing application. The electrical properties were investigated owing to impedance spectroscopy method which is a chemical technique giving rise to many information about the resistance and capacitance effects in the grain boundaries. The grain becomes an electrical circuit formed by a mixture of resistances and capacitances which give semi circles named Nyquist curves. The interpretation of the Nyquist curves gives us the information's needed to test the performances of our gas sensors samples.

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