

## Electrophysical and Thermoelectric Properties of Nano-scaled In<sub>2</sub>O<sub>3</sub>:Sn, Zn, Ga-Based Thin Films: Achievements and Limitations for Thermoelectric Applications

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**Abstract :** The thermoelectric properties of nano-scaled In<sub>2</sub>O<sub>3</sub>:Sn films deposited by spray pyrolysis are considered in the present report. It is shown that multicomponent In<sub>2</sub>O<sub>3</sub>:Sn-based films are promising material for the application in thermoelectric devices. It is established that the increase in the efficiency of thermoelectric conversion at C<sub>Sn</sub>~5% occurred due to nano-scaled structure of the films studied and the effect of the grain boundary filtering of the low energy electrons. There are also analyzed the limitations that may appear during such material using in devices developed for the market of thermoelectric generators and refrigerators. Studies showed that the stability of nano-scaled film's parameters is the main problem which can limit the application of these materials in high temperature thermoelectric converters.

**Keywords :** energy conversion technologies, thermoelectricity, In<sub>2</sub>O<sub>3</sub>-based films, power factor, nanocomposites, stability

**Conference Title :** ICEECE 2016 : International Conference on Energy, Environmental and Chemical Engineering

**Conference Location :** Stockholm, Sweden

**Conference Dates :** July 11-12, 2016