Enhanced gas sensing properties of IZO thin films using SILAR

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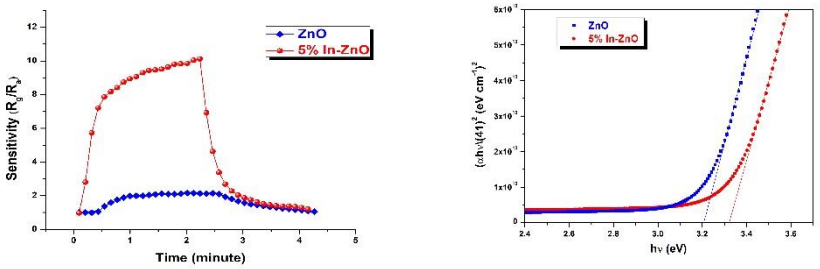
In the last decades, resistive gas sensors based on semiconductor oxides have been the topic of interest for a long time due to their high sensitivity to both oxidizing and reducing gases. These sensors meet the main market requirements such as low cost, small size, and easy maintenance.

Currently, much attention has been attracted to finding an effective method to improve the nanomaterials' sensing ability and selectivity. Sensor devices based on semiconductor oxide like ZnO are important sensing material for detection of hazardous gases [1]. ZnO is the most extensively applied as a gas sensing material, since it has remarkable characteristics necessary for an ideal metal oxide gas sensor such as wide band-gap energy (Eg=3.37 eV) and high binding energy (Ee=60 meV) [2]. Several approaches have been applied to improve gas sensing performance, for instance, morphological changes by doping metal. Especially, indium (In) significantly influences the electrical, chemical, structural, and gas sensing properties of ZnO.

In the present work, the effect of In doping on the various properties of ZnO was investigated. The pure ZnO and indium doped ZnO thin films have been synthesized by the SILAR method. The obtained results clearly demonstrated a significant improvement in gas sensitivity by incorporating In into the ZnO.



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References

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