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## Improve physical properties of rare earth metal doped strontium sulphide for optoelectronic purpose

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The electrochemical deposition was used to synthesize SrS-doped zirconium materials at varying dopant concentrations of 0.01 to 0.03 mol. The surface micrograph of the zirconium doped films is well structured on the surface of the FTO used for the synthesis without any crack or lattice strain. The spectrum is polycrystalline with a cubic structure and a prominent peak at (111) orientation for SrS film. At the introduction of the zirconium dopant 0.01 mol, the peak intensity increases with a prominent peak at (211) which indicate acceptance of zirconium dopant in the precursor and as the dopant concentration rises the peak intensity decreases which depicts that a higher concentration of zirconium reduces the peak intensity of the films. The Williamson-Hall plot's slope increases as the dopant concentration increases. The materials exhibit a thickness increase of 121.32 to 126.13 nm and a decrease in film resistivity from  $1.12 \times 10^9$  to  $1.32 \times 10^9$  ohm.m, which further led to an increase in conductivity from  $7.57 \times 10^8$  to  $8.26 \times 10^8$  S/m. The bandgap energy of SrS is 1.50 eV while SrS-doped zirconium is 1.35 eV – 2.52 eV.

### Apply to be considered for a student ; award (Yes / No)?

Yes

### Level for award;(Hons, MSc, PhD, N/A)?

PhD

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