

Resume

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Research Activities

Thin Film Laboratory at National Institute of Foundry and Forge Technology (NIFFT), Ranchi was established in July 1994 to promote multidisciplinary activities focused to various facets of Nano technology and systems in the form of research, teaching and consultancy. A small group of research scholars led by me commenced work to build thin-film technology facilities. The Thin Film Laboratory aims at initiating and pursuing research activities in areas related to nanomaterials and thin films phenomena through funded research projects, doctoral and master's level projects, bachelor degree projects, short term programs and collaborative research with other universities, institutes and industries. The major funding of the laboratory was through TEQIP (Technical Education Quality Improvement Program) of the Government of India. There were also research projects sponsored by other scientific funding agencies such as the Department of Science and Technology, Government of India.

The Laboratory has established facilities for depositing films of metals, insulators, semiconductors and alloys in amorphous as well as polycrystalline and single crystal form by Thermal evaporation, Solution growth, Electrodeposition, Spin coating and Dip Coating. The facilities allow the preparation of films under controlled conditions and the study of structural, electrical, and optical properties thereof.

The group of research scholars are working for development of nanomaterials, semiconducting thin films for device applications under my supervision. Our earlier work was on photo electrochemical and photovoltaic solar cells. Group had developed CdTe, CuInSe₂, Cu(In,Ga)Se₂ CdSe, CdS solar cells and reported the conversion efficiency of 12%. In the aqueous system the problem of solubility, uniformity, temperature, hydrogen evolution etc. were

coming out but it was settled down by using non-aqueous medium. In this regard our group had developed CdTe, Cu-In alloy, CdSe films in non-aqueous medium. Presently our group is working on non-aqueous quantum dots deposition of semiconducting materials. Electrodeposition and Chemical bath deposition are employed for the deposition of CdSe, ZnSe, ZnTe, CdS, CdZnS etc films and characterized by various characterization techniques. Their work had been reported in various International and National journal of repute. Some recent publications are as follows:

Publications of S.R.Kumar

1. "Development of Nanocrystalline ZnSe Thin Film through Electrodeposition from Non aqueous Solution", **Shyam Ranjan Kumar**, Mohan N.and JoydeepMaity, J.Scripta Mat. 67 (2012) 396-399.
2. "Electrodeposition of CdSe Nanocrystalline Thin Film using Non aqueous", **S.R.Kumar**, Binod Kumar, Int. J. of Nanotechnology and Applications 6 No 3 (2012) 258-263.
3. "Effect of Zn as Nanofilm of CdS deposited by Chemical Bath Method in Non aqueous Medium", **S.R Kumar**, Suresh Kumar, S. Sahu, D. Roy and S.K Sharma, J. Advanced Science Letter 20(3-4), March 2014 P 686- 688.
4. "Synthesis and Characterization of Non- Aqueous Electrodeposited ZnSe Thin Film", **S.R Kumar**, ShashikantRajpal, International Journal of Chemical, Nuclear, Materials and Metallurgical Engineering Vol: 9,No.3, 2015
5. "Structure, Composition and Optical properties of Non aqueous Deposited ZnCdS Nanocrystalline Film", **S.R.Kumar**, Suresh Kumar, S.K. Sharma and D. Roy, Materials Today: Proceedings 2 (2015) 4563-4568.
6. "Effect of Annealing on the Surface and Optical Properties of ZnCdS Nanocrystalline Thin Films", S. Kumar, S. Rajpal, S. K. Sharma, D. Roy, **S. R. Kumar**, Chalcogenide Letters Vol. 14, No. 1, January 2017, p. 17 – 23
7. "Effect of Zn Concentration on the Structural, Morphological and Optical Properties of Ternary ZnCdS Nanocrystalline Thin Films",Suresh Kumar, ShashikantRajpal, S.K.Sharma, D.Roy, **S.R.Kumar**, Digest Journal of Nanomaterials and Biostructure, Vol. 12, No. 2, April - June 2017, p. 339 – 347
8. "Effect of Annealing on Nanocrystalline ZnO Thin Film Developed by Electrodeposition Method", ShashikantRajpal, **S.R. Kumar**, Materials Today: Proceeding, Elsevier 4 (2017) 3754–3759
9. "Thermoluminescent Properties of nanocrystalline ZnTe thin films : Structural and Morphological studies",ShashikantRajpal, **S.R.Kumar**, Physica B:Condensed Matter, 534(2018),145-149.

10. "Development of Electrodeposited ZnTe Thin Films in Non-aqueous Medium",
ShashikantRajpal, **S.R.Kumar**, Journal of Nanoelectronics and Optoelectronics
(Accepted)