

Seminar Talk

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Title: High efficient ultrathin CIGS solar cell

Abstract:

The global demand for renewable energy is growing rapidly. Increasing the global share of alternative sources of energy would not only bring environmental benefits, but also enhance overall energy security by diversifying energy supply. Many technology options exist nowadays to harvest the power of the sun, a sustainable energy source, and generate electricity directly from this source via the photovoltaic effect. Among them, Cu(In,Ga)Se₂ (CIGS) has gained significant momentum as a possible high efficiency and low cost thin film solar cell material. The capacity to scale up any photovoltaic technology is one of the criteria that will determine its long term viability. In the case of CIGS, many manufacturers are showing the way for GW-scale production capacity. However, as CIGS technology continues to increase its share of the market, the scarcity and high price of indium will potentially affect its ability to compete with other technologies. One way to avoid this bottleneck is to reduce the importance of indium in the fabrication of the cell simply by reducing its thickness without significant efficiency loss. Reducing the thickness of CIGS thin film will not only save the material but will also lower the production time and the power needed to produce the cell. This presentation will highlight the ultrathin CIGS material deposition technique, stoichiometry control and the role of impurities. Then heterojunction solar cells will be described and key to understand how CIGS solar cells efficiency can be optimized be given.

Bio:

Krishna Aryal received his B.S. degree in Physics from Tribhuvan University (Nepal) and his M.S. degree in Electrical Engineering from Texas Tech University. He is currently a PhD candidate in the Virginia Institute of Photovoltaics (VIPv) at Old Dominion University. His research interests include thin film deposition and characterization, as well as solar cell and photo-electrochemical cell fabrication. To date, he has authored or co-authored over 22 research papers published in international peer-reviewed Journals and conference proceedings.