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GENERALITAT VALENCIANA

#ICMolTalks

Prof. Alan Sellinger

National Renewable Energy Laboratories (NREL), Golden, CO. USA

July 11th - 12:00h

Assembly Hall - ICMol

Abstract

Organic and Polymeric Materials for Application in Ionizing Radiation Detection and Perovskite Solar Cells

This seminar will describe our work designing and synthesizing novel organic and polymeric materials for application in detecting and discriminating neutrons from a gamma radiation background, and charge transport materials for perovskite solar cells. For radiation detection, the major supplier in the United States for plastic scintillators (PS) is Eljen Technology (https://eljentechnology.com). Their process for preparing PS takes about 10 days from start to finish. This means carefully heating solutions of very flammable, reactive and toxic monomer liquids in large ovens to convert them to plastics. Furthermore, this process simply blends fluorescent dopants into the plastics where they can diffuse and leach out overtime causing issues with PS stability. We have targeted these bottlenecks and developed processes that can do this conversion in less than 2 days and produce PS with very similar properties. Furthermore, we have prepared reactive dopants that can be chemically integrated into the PS matrix and thus not diffuse and leach out resulting in enhanced stability. Lastly, we are working on a new promising area termed organic glass scintillators (OGS) and have recently made some exciting progress. With regards to perovskite solar, we have recently designed and prepared new hole transport materials that covalently bind at interfaces between electrodes and the active perovskite layer to significantly improve device efficiency and stability.

Biography

Alan Sellinger was born and raised in Ann Arbor and received his B.S. in Chemistry from Eastern Michigan University and Ph.D. in Macromolecular Science & Engineering from the University of Michigan in 1997 under the guidance of Richard (Rick) Laine. He then moved to Sandia National Laboratories in Albuquerque, NM for postdoctoral work with Jeff Brinker. Alan has 7 years industrial R&D experience with Gelman Sciences, Canon R&D Americas, and Opsys US Corp. He held the position of Senior Scientist at the Institute of Materials Research and Engineering (IMRE), in the Republic of Singapore from 2003-2008, then moved to Stanford University from 2008-2012 as a Consulting Associate Professor in Materials Science & Engineering and Executive Director of the Center for Advanced Molecular Photovoltaics (CAMP). Since 2012 he has been Professor of Chemistry and Materials Science at the Colorado School of Mines and Senior Scientist at the National Renewable Energy Lab (NREL). For hobbies, Alan likes to hike in the Rocky mountains with his wife Nancy and play futbol (soccer) when his knee doesn't hurt.