DS 1: Invited – Mitzi

Time: Monday 10:15–11:00 Location: GER 37

Invited Talk DS 1.1 Mon 10:15 GER 37

High-performance liquid- and vacuum-processed CZTSSe photovoltaic devices — •David B. Mitzi[1], Oki Gunawan[1], Teodor K. Todorov[1], Aaron R. Barkhouse[1], Kejia Wang[1], Byungha Shin[1], Richard Haight[1], Supratik Guha[1], Kathleen B. Reuter[1], Thomas Goislard de Monsabert[1], S. Jay Chey[1], and Andrew J. Kellock[2] — [1]IBM T. J. Watson Research Center, Yorktown Heights, NY, USA — [2]IBM Almaden Research Center, San Jose, CA, USA

While thin-film CdTe and CIGS (Cu-In-Ga-Se) photovoltaic technologies are increasing market share due to their cost competitiveness and high performance, reliance on the expensive and/or scarce elements Ga, In and Te, or the heavy metal Cd, has presented a potential obstacle to the target of terawatt deployment using these materials. The kesterites, $Cu_2ZnSnS_{4-y}Se_y$ (CZTSSe), are considered a promising alternative because of similar electronic properties to the two leading technologies and low-cost, readily-available constituents. This talk will focus on recent developments in fabricating high-performance CZTSSe devices. First, a simple particle-based liquid approach has been employed to prepare photovoltaic devices with a glass/Mo/CZTSSe ($y > 2$)/CdS/i-ZnO/ITO structure and with power conversion efficiencies of $> 9.5\,\%$, a record for the kesterites. Using a vacuum-based coevaporation approach, power conversion efficiencies of as high as 7