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Physical Sciences Seminar

Historic overview and design principles for optoelectronic perovskite semiconductor materials

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Host: Georgios Katsaros

Perovskite solar cells (PSCs) have created much excitement in the past years and attract spotlight attention from research groups all over the world with many thousands of publications every year. This talk will provide an overview on the reasons for this unique success story highlighting the historic development as well as the specific material properties that make perovskites so attractive for the research community.The current challenges are exemplified using a high-performance model systems for PSCs (multication Rb, Cs, methylammonium (MA), formamidinium (FA) perovskites).(1,2) The triple cation (Cs, MA, FA) achieves power conversion efficiencies (PCEs) close to 21% due to suppressed phase impurities. This results in more robust materials enabling breakthrough reproducibility. Through multication engineering, the seemingly too small Rb can be integrated (unsuited as a single-cation perovskite).(2) This results in a stabilized efficiency of 21.6%with one of the smallest differences between band gap and voltage ever measured for any PV material. Polymer-coated cells maintained 95% of their initial performance at elevated temperature for 500 hours under working conditions, a crucial step towards industrialisation of PSCs.(1) Saliba et al. Cesium-containing triple cation perovskite solar cells: improved stability, reproducibility and high efficiency. Energy & Environmental Science (2016)(2) Saliba et al. Incorporation of rubidium cations into perovskite solar cells improves photovoltaic performance. Science (2016)

Monday, January 22, 2018 12:00pm - 01:00pm

IST Austria Campus Mondi Seminar Room 2, Central Building

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