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DIMENSIONAL TAILORING OF HYBRID PEROVSKITES FOR EFFICIENT AND STABLE SOLAR CELLS

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Organic-inorganic lead halide perovskites have shown impressive power conversion efficiency (PCE) in a range of solar cell architectures.¹⁻² Despite the multiple ionic compositions that have been reported so far, the presence of organic constituents is an essential element in all the high efficiency formulations, with the methylammonium (MA) and formamidinium (FA) cations being the sole realistic options available to date. In this study, we demonstrate a novel three-dimensional (3D) perovskite with improved material stability as a result of the incorporation of an alternative organic cation, guanidinium, into the MAPbI₃ crystal structure.³ The new MA_{1-x}GuaxPbI₃ perovskite shows enhanced thermal stability and intrinsically new structural and optoelectronic properties. This allows for stable and high-power conversion efficiencies over 20%, a fundamental step within the perovskite field

Biography

Dr. Md. K. Nazeeruddin received M.Sc. and Ph. D. in inorganic chemistry from Osmania University, Hyderabad, India. He joined as a Lecturer in Deccan College of Engineering and Technology, Osmania University in 1986, and sub-

sequently, moved to Central Salt and Marine Chemicals Research Institute, Bhavnagar, as a Research Associate. He was awarded the Government of India's fellowship in 1987 for study abroad. In 2014, EPFL awarded him the title of Professor. His current research at EPFL focuses on Dye Sensitized Solar Cells, Perovskite Solar Cells, CO₂ reduction, Hydrogen production, and Light-emitting diodes. He has published more than 509 peer-reviewed papers, ten book chapters, and he is inventor/co-inventor of over 50 patents. The high impact of his work has been recognized by invitations to speak at over 130 international conferences, and has been nominated to the OLLA International Scientific Advisory Board. He appeared in the ISI listing of most cited chemists, and has more than 49'000 citations with an h-index of 105. He is teaching "Functional Materials" course at EPFL, and Korea University; directing, and managing several industrial, national, and European Union projects. He was awarded EPFL Excellence prize in 1998 and 2006, Brazilian FAPESP Fellowship in 1999, Japanese Government Science & Technology Agency Fellowship, in 1998, Government of India National Fellowship in 1987-1988. Recently he has been appointed as World Class University (WCU) professor by the Korea University, Jochiwon, Korea (http://dses.korea.ac.kr/eng/sub01_06_2.htm), Adjunct Professor by the King Abdulaziz University, Jeddah, Saudi Arabia and Eminent Professor in Brunei.

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