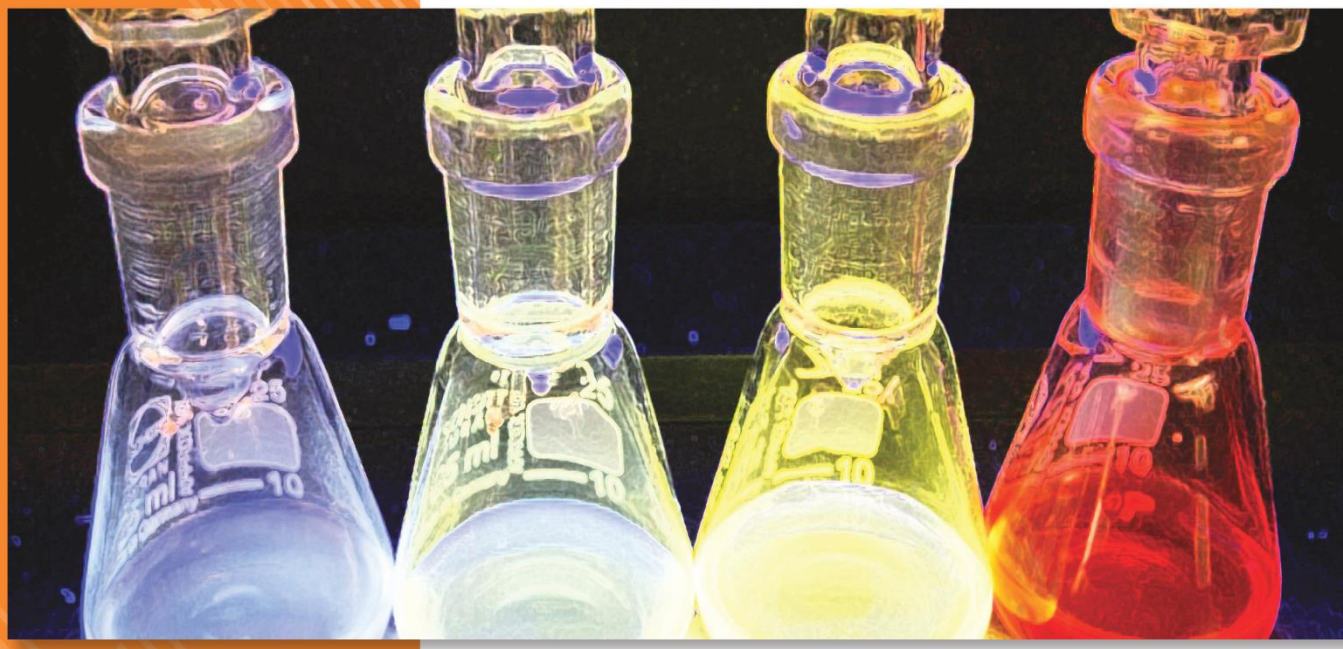
IfP
Institut für Polymertechnologie

BERGISCHE UNIVERSITÄT WUPPERTAL



Ferroelectricity in methylammonium lead iodide perovskite solar cells

Dr. Alexander Colsmann
Light Technology Institute
& Institute for Applied Materials – Ceramic Materials and Technologies,
Karlsruhe Institute of Technology,

Among the emerging photovoltaic technologies, perovskite solar cells stand out with remarkable power conversion efficiencies (PCEs) and low-cost solution processability, rivaling established technologies. Currently, the scientific community controversially discusses the importance of the ferroic properties for the exceptional performance of MAPbI3 light-harvesting layers.

In this work, we performed a comprehensive AFM study including Piezoresponse Force Microscopy (PFM) and Kelvin Probe Force Microscopy (KPFM). On large flat crystals, we find 90 nm wide ferroelectric domains of alternating in-plane polarization. EBSD mapping allowed for the spatially resolved correlation of the ferroelectric patterns and the crystal orientation within the MAPbI3 thin-films. Electrical simulations provide insight into the working principle of ferroelectric MAPbI3 solar cells. Poling experiments elucidate the impact of the ferroelectric microstructure on macroscopic device properties.

Altogether, these investigations provide micro-structural target properties for MAPbI3 thin-film deposition and outline pathways forward for more efficient, eco-friendly and lead-free perovskite solar cells.

4. November 2019
16:00 Uhr
Campus Freudenberg
Hörsaal FZH3

www.ifp.uni-wuppertal.de