

Water-processed hybrid solar cells

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in situ studies of particular fabrication steps

Summary

Particular environmentally friendly processing of hybrid solar cells with the solvent water is feasible with an active layer consisting of laserablated titania and a water-soluble polythiophene [1]. One way to optimize conversion efficiencies of these devices is the introduction of a vertical compositional gradient of the two components of the active layer. Dip-coating and spray-coating have been utilized as techniques which are suitable for the cost-effective preparation of hybrid photovoltaics. We followed the development of the morphology during spray deposition *in situ* with high spatial and temporal resolution. The mesoscale was probed with GISAXS and the crystallinity of the polymer and the inorganic component was probed with GIWAXS. The changes of the morphology and the influence on photovoltaic performance with the introduction of a compositional gradient are discussed. [1] Körstgens et al., *Nanoscale* 7, 2900 (2015).

Primary author: Dr KÖRSTGENS, Volker (TU München, Physik-Department, LS Funktionelle Materialien)

Presenter: Dr KÖRSTGENS, Volker (TU München, Physik-Department, LS Funktionelle Materialien)

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