Contribution ID: **98** Type: **Poster**

Interface stability of active layers on conductive nanopaper for organic thin-film photovoltaics

Tuesday, 5 December 2023 14:00 (3 hours)

Flexible organic photovoltaics make use of polymer-based materials. A novel development is to combine cellulose nanofibrils (CNF) and poly(3,4-ethylenedioxythiophene):polystyrene sulfonate (PEDOT:PSS) for fabricating sustainable, flexible, multifunctional and stable electrodes (so-called 'power-paper'). When depositing the active layer, thermal annealing is a necessary step for optimizing the morphology of the active layer. With the CNF/PEDOT:PSS thin-film being porous, it is thus crucial to observe the assembly, layering, and the interactions at the interface active layer/power-paper directly. We hence investigated the interface stability of a functional P3HT:PCBM stack (deuterated and non-deuterated) on a CNF/PEDOT:PSS thin-film after thermal annealing (T = 170℃, inert atmosphere) and present our results obtained using neutron reflectometry at the Chinese Spallation Neutron Source (CSNS) at beamline 02.

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Session Classification: Poster Session

Track Classification: Soft Matter