Contribution ID: **96** Type: **Poster**

SPUTTER DEPOSITION OF SILVER ON NANOSTRUCTURED PMMA-b-P3HT COPOLYMER THIN FILMS

Wednesday, 9 December 2020 17:40 (20 minutes)

Nanostructured polymer-metal-composite films demonstrate great perspectives for optoelectronic applications, e.g. as sensors [1] or organic photovoltaics (OPV) [2]. To enhance properties of such devices the metal cluster self-assembly process needs to be understood [3, 4]. We correlate the emerging nanoscale morphologies with electronic properties and quantify the difference in silver growth, comparing the diblock copolymer template with its corresponding homopolymer thin film counterparts [5]. Hence, we are able to determine the influence of the respective polymer blocks and to observe substrate effects on silver cluster percolation threshold [5], which affects the insulator-to-metal transition (IMT). In this contribution, we investigate the silver cluster morphology during the growth on a PMMA-b-P3HT block copolymer template. Such block copolymer templates are used as to install tailor nanostructures in OPV, as it contains one p-type organic semiconductor (P3HT) [2]. We applied with grazing incidence small-angle X-ray scattering (GISAXS) to observe the cluster formation, as well as the crystallinity of the metal film formation with grazing incidence wide-angle X-ray scattering (GIWAXS) in situ during sputter deposition. Our study reveals the selective wetting of silver on one of the polymer blocks and the influence of the template on the percolation behavior of the silver layer, which is measured with resistivity measurements during the sputter deposition.

Primary author: GENSCH, Marc (DESY/TUM)

Co-authors: Dr SCHWARTZKOPF, Matthias (DESY); Mr BRETT, Calvin (DEYS & KTH); SCHAPER, Simon (TU München, Physik-Department, Lehrstruhl für Funktionelle Materialien); KREUZER, Lucas (TU München, Physik-Department, LS Funktionelle Materialien); LI, Nian (TU München, Physik-Department, LS Funktionelle Materialien); DREWES, Jonas (CAU Kiel); Dr OLEKSANDR, Polonsky (CAU Kiel); Dr STRUNSKUS, Thomas (CAU Kiel); Prof. FRANZ, Faupel (CAU Kiel); Prof. MÜLLER-BUSCHBAUM, Peter (TU München, Physik-Department, LS Funktionelle Materialien); Prof. ROTH, Stephan (DESY / KTH)

Presenter: GENSCH, Marc (DESY/TUM)

Session Classification: Joint poster session of MLZ User Meeting and DN2020

Track Classification: UM: Soft Matter