



Contribution ID: 110

Type: Poster

Feasible tuning of microstacking structure and oxidation level in PEDOT: PSS thin films via sequential post-treatment

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

Organic semiconductors have attracted intense attention because of their potential use in mechanically flexible, lightweight, and inexpensive electronic devices. Especially, PEDOT:PSS is the most studied conducting polymer system in thermoelectric devices due to its intrinsically high electrical conductivity, low thermal conductivity, and high mechanical flexibility. The energy conversion efficiency of a TE material is evaluated by a dimensionless figure of merit ZT and defined as $ZT = S^2\sigma T/k$ where S is the Seebeck coefficient, σ is the electrical conductivity, T is the absolute temperature, k is the thermal conductivity, and $S^2\sigma$ is defined as the power factor (PF). However, it is generally considered that it is difficult to obtain a high ZT value of TE materials, due to the fact that the parameters S , σ , and k are interdependent as a function of carrier concentration and hard to be optimized simultaneously. To date, post-treatment is regarded as one promising approach to significantly enhance ZT values of PEDOT:PSS. Herein, PEDOT:PSS thin films are overcoated with salts/DMSO mixtures in order to optimize their TE performance. Subsequently, the surface morphology and the inner morphology are probed, using atomic force microscopy (AFM) and grazing-incidence wide/small-angle X-ray scattering (GISAXS/GIWAXS), respectively. Additionally, UV-Vis spectroscopy, Raman spectroscopy are used to investigate the mechanism behind for TE performance enhancement.

Primary authors: TU, Suo (Institute of Functional Materials); TIAN, Ting; MÜLLER-BUSCHBAUM, Peter (TU München, Physik-Department, LS Funktionelle Materialien)

Presenter: TU, Suo (Institute of Functional Materials)

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

Track Classification: UM: Materials Science