Institut Européen de Chimie et Biologie

I E C B

High Performance Polymer and Polymer/Inorganic Thermoelectric Materials

Ioannis Petsagkourakis
LCPO, CNRS-UMR5629 (Equipe G. Hadziioannou, ENSCBP),
Bordeaux, FRANCE

Conducting polymers (CPs) have recently gained the attention of the scientific community due to their prospective use in thermoelectric applications [1,2]. Particularly, it has been proven that an important parameter for tuning the thermoelectric properties and the charge transport behavior of the CP is the shape of the DOS in the band edge, where a more steep band edge would be translated in a semi-metallic behavior for the system, with higher thermoelectric efficiencies. In the present study the correlation between material structure, electronic structure and electronic/ thermoelectric properties, is investigated through careful material design, towards an efficient thermoelectric polymer material. Additionally, the hybrid devices were fabricated as an alternative means to further enhance the thermoelectric efficiency of the material.

References :
[1] Bubnova, O. et al. Optimization of the thermoelectric figure of merit in the conducting polymer poly(3,4-ethylenedioxythiophene). Nat. Mater. 10, 429–433 (2011).
[2] Kim, G.-H., Shao, L., Zhang, K. & Pipe, K. P. Engineered doping of organic semiconductors for enhanced thermoelectric efficiency. Nat. Mater. 12, 719–723 (2013).