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Correlation between optical and morphological properties of π-conjugated organic materials

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Improving the performance of organic electronic devices requires the understanding of the photophysical properties of π-conjugated organic materials. For this purpose, Variable Angle Spectroscopic Ellipsometry (VASE), spectrophotometry and photoluminescence measurements are performed. Spectroscopic ellipsometry is used to determine the optical properties and to extract electronic transitions of π-conjugated organic thin films made of small molecules : PC60BM, PC70BM [1], polymers : P3HT, PTB7, PTB7-Th and their blends [2]. Then, in order to identify the origin of the optical transitions, absorbance and photoluminescence measurements are performed as a function of concentration and temperature to modify the aggregation state in polymer solutions. This study permits to determine the electronic structure of π-conjugated organic materials and to correlate the morphological properties to the optical ones.

[1] F. Bencheikh-Aboura et al., Chem. Phys., vol. 450-451, pp. 102–108, 2015.
[2] S. Ben Dkhil et al., Adv. Energy Mater., vol. 4, no. 18, pp. 1-12(1400805), 2014.

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