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Using neutron techniques to explore the properties of thiophene-based polymers for organic electronics

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In this talk I will showcase how the use of neutrons is helpful to gain information on the behaviour of polythiophene-fullerene systems for organic electronic applications. I will concentrate on two areas. First, nanoscale control of the structural organisation and as a result the dynamical behaviour, is paramount to boost their performance. Quasi-elastic scattering has been used to probe the effect of fullerenes on polymer dynamics. In addition, neutron reflectivity shows that the intercalation of the fullerene molecules between the side-chains can be tuned by simply controlling the degree of self-organization of the polymer. Second, we use neutrons in a slightly different way, not by scattering but by irradiation. I will present results of the first study of the neutron radiation tolerance of two polythiophenes showing that crystallinity plays an important role.

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