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## Thiophene based Semiconductors for Organic Solar Cells

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The polymers poly(3-hexylthiophene), poly(3-thiopheneacetic acid), poly(3-thiopheneethanol) and the related copolymers are prepared starting from the respective monomer units by chemical oxidative polymerization. Graphene has also been oxidized to graphene oxide, which due to its functional groups is much more soluble in organic solvents and forms far more homogeneous layers than pure graphene and is also liquid processable. The synthesized molecules are used either as electron donor or electron acceptor in the organic solar cell and are characterized via infrared, absorption and fluorescence spectroscopy. The organic materials are electrically conductive due to their extended conjugated  $\pi$ -electron system and therefore require neither heavy metals / heavy metal complexes nor dopants for charge transport and can be easily deposited via spin-coating from a solution.

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