

## Hybrid quantum dots: poly(3-hexylthiophene) solar cells

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Blends of semiconducting polymers and inorganic semiconductor nanocrystals, like quantum dots (QDs), have started to attract intensive interests because of their inexpensive costs and the ability of being solution processed. Both facts render them very promising candidates for next generation organic photovoltaics. Hybrid bulk heterojunction (BHJ) solar cells integrated with CuInSexS2-x (CISS) QDs and poly(3-hexylthiophene) (P3HT) are under investigation. CISS QDs are used as acceptor in our BHJ solar cell schematic, due to their strong optical absorption, tunable band-gap reaching to near infrared and long exciton lifetime, while P3HT is employed as donor material. The surface engineering of the QDs is investigated as a key factor to increase the exciton diffusion length and therefore improve the performance of solar cell devices. The QDs- P3HT active layers with 120 nm thickness are fabricated by blending using the spin-coating method. Different blend ratios are compared.

### Summary

Heavy metal free nano-crystals have been introduced to bulk heterojunction organic solar cells for the optimizations of the solar absorption behavior as well as the charge mobility.

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