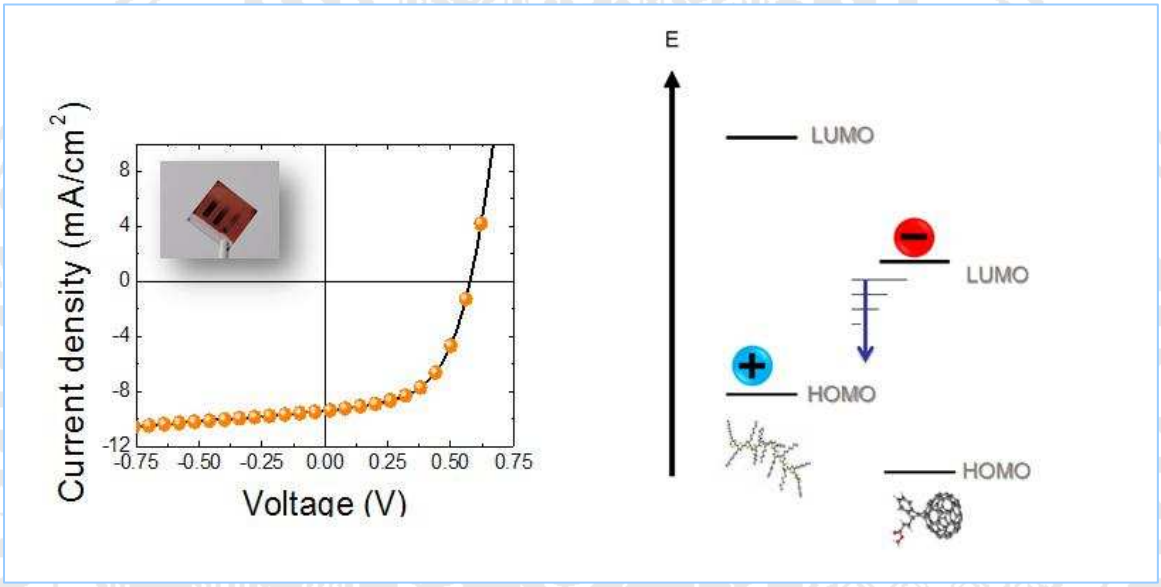
PHYSIKALISCHES KOLLOQUIUM

AM 28. JANUAR 2013 UM 17 UHR C.T.

IM GROßEN HÖRSAAL



TRANSPORT AND RECOMBINATION IN POLYMER: FULLERENE BULK HETEROJUNCTION SOLAR CELLS

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In solar cells free charge carriers can recombine both via bimolecular (Langevin) and trap-assisted recombination (Shockley-Read-Hall). Trap-assisted recombination of electrons and holes is governed by capture coefficients that are thermally activated with an identical activation energy as measured for the hole mobility μ_p. To elucidate which recombination mechanism is dominant in organic solar cells we investigated Charge-transfer (CT) state electroluminescence in several polymer: fullerene bulk heterojunction solar cells. The ideality factor of the electroluminescence reveals that the CT emission in polymer: fullerene solar cells originates from free-carrier bimolecular recombination at the donor-acceptor interface, rather than a charge trap-mediated process. These results are in agreement with measurements of the illumination-intensity dependence of the open-circuit voltage.