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Supporting Information

Hybrid inorganic-organic tandem solar cells for broad coverage of the solar spectrum

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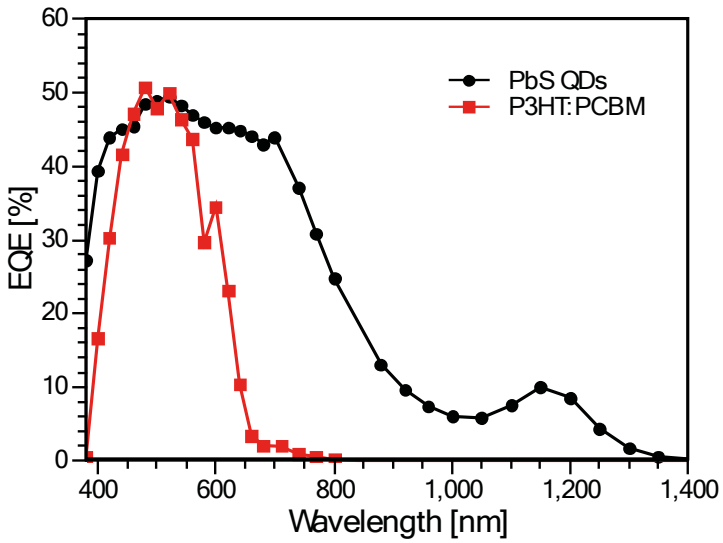

Fig. S1. EQE spectra of the PbS QD reference cell (black circles) with structure , and the P3HT:PCBM reference cell (red squares). The lines are provides as a guide to the eye.

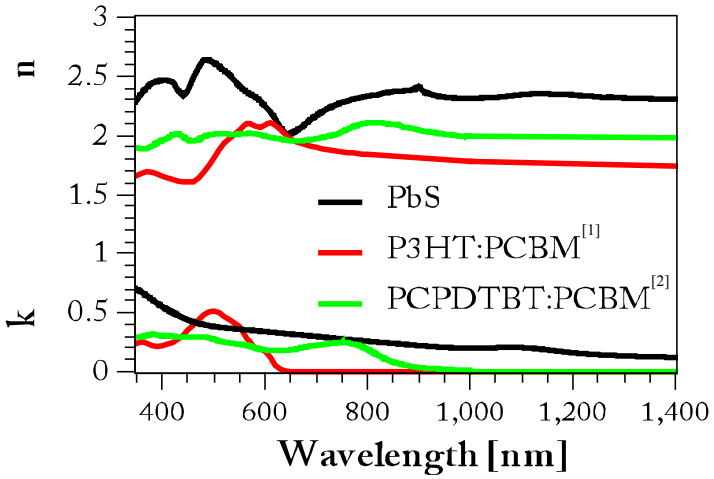

Fig. S2. Complex refractive indices of the materials used in the optical simulations. Optical modelling was performed according to the transfer matrix formalism described by Pettersson et al.[3]

[1]: H. Hoppe, S. Shokhovets and G. Gobsch, *Physica Status Solidi (RRL)-Rapid Research Letters*, 2007, **1**, R40.
[2]: T. Ameri, G. Dennler, C. Waldauf, H. Azimi, A. Seemann, K. Forberich, J. Hauch, M. Scharber, K. Hingerl and C. J. Brabec, *Advanced Functional Materials*, 2010, **20**, 1592.
[3] L. A. A. Pettersson, L. S. Roman and O. Inganäs, *J. Appl. Phys.*, 1999, **86**, 487.

Fig. S3. Left: Surface profiles of the subcells Jsc's as a function of the subcell thicknesses. Right: contour plot of the current of the tandem device assuming the current is equal to the smallest of the currents of the subcells. The black line indicates current matching between the subcells. The modelled structure is depicted in the inset. Replacing P3HT with a small bandgap polymer such as PCPDTBT as the rear cell would increase the potential current to over 10 mA cm^{-2}. However, a more promising approach would be to use the PbS QD in the rear subcell. In this way, the current is modelled to reach 9.5 mA cm^{-2} for P3HT and 11.8 mA cm^{-2} for a PCPDTBT front cell. In addition, with polymer in the front cell, high current can be achieved in a much broader range and smaller layer thicknesses of thickness than with the polymer as the rear cell.

