

Supporting Information for

## Designing an efficient Graphene Quantum Dot-Filled Luminescent Down Shifting Layer to Improve the Stability and Efficiency of Perovskite Solar Cell by Simple Optical Modeling

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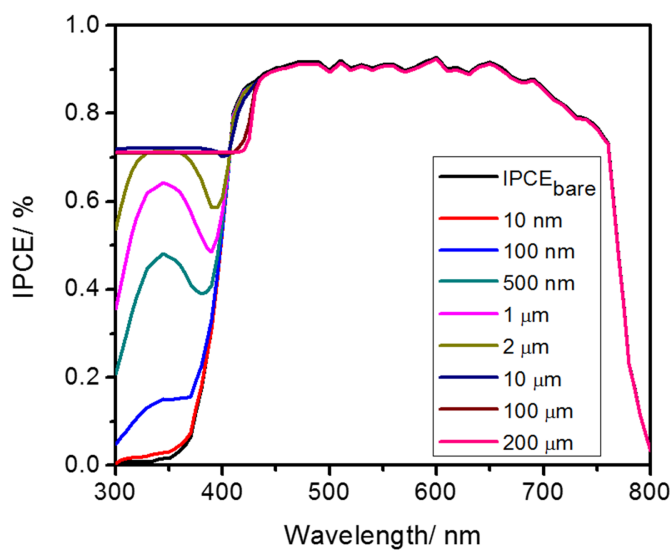


Fig. S1. Calculated total IPCE spectra for PSCs without and with GQD-EDA-filled LDS layers of different thicknesses.

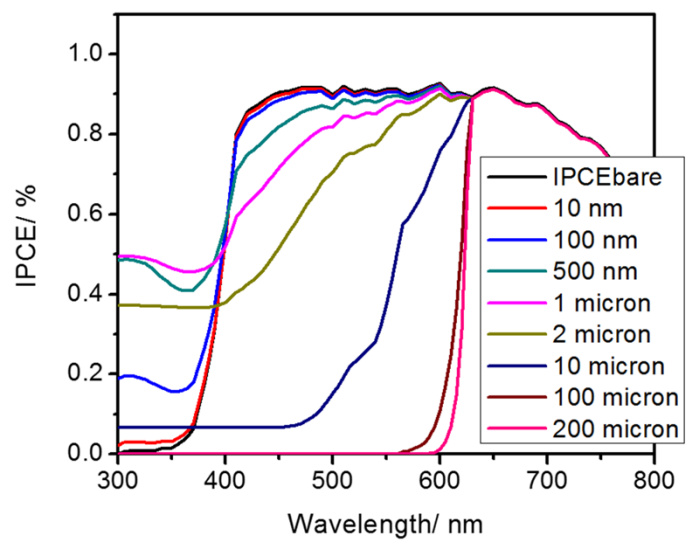


Fig. S2. Calculated total IPCE spectra for PSCs without and with GQD-G-filled LDS layers of different thicknesses.