

Supplementary information for:

# Enhancement of the Fill Factor through an Increase of the Crystallinity in Fullerene-Based Small-Molecule Organic Photovoltaic Cells

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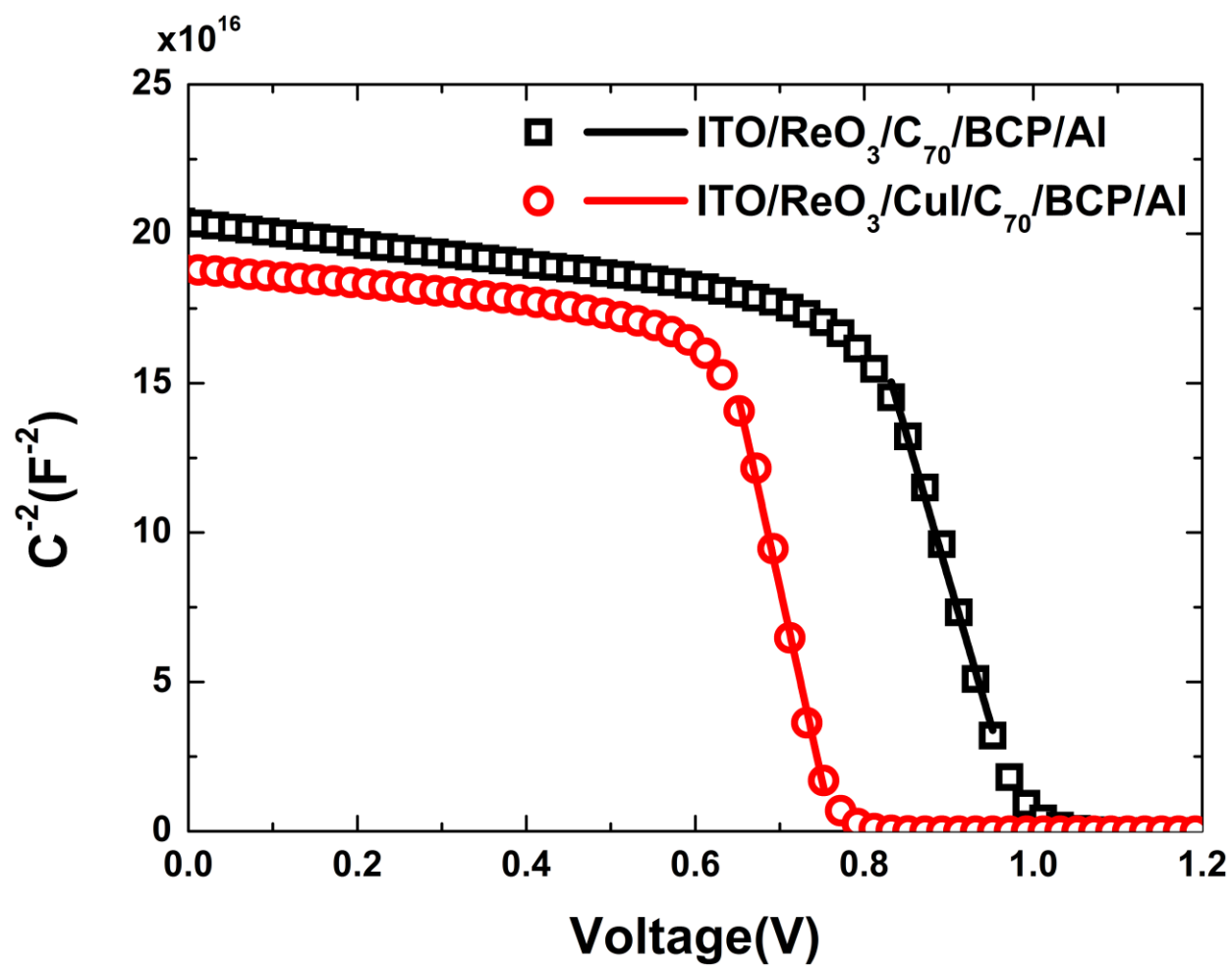


Figure S1. Capacitance-voltage characteristics of Schottky solar cells. Solid lines represent Mott-Schottky plot.

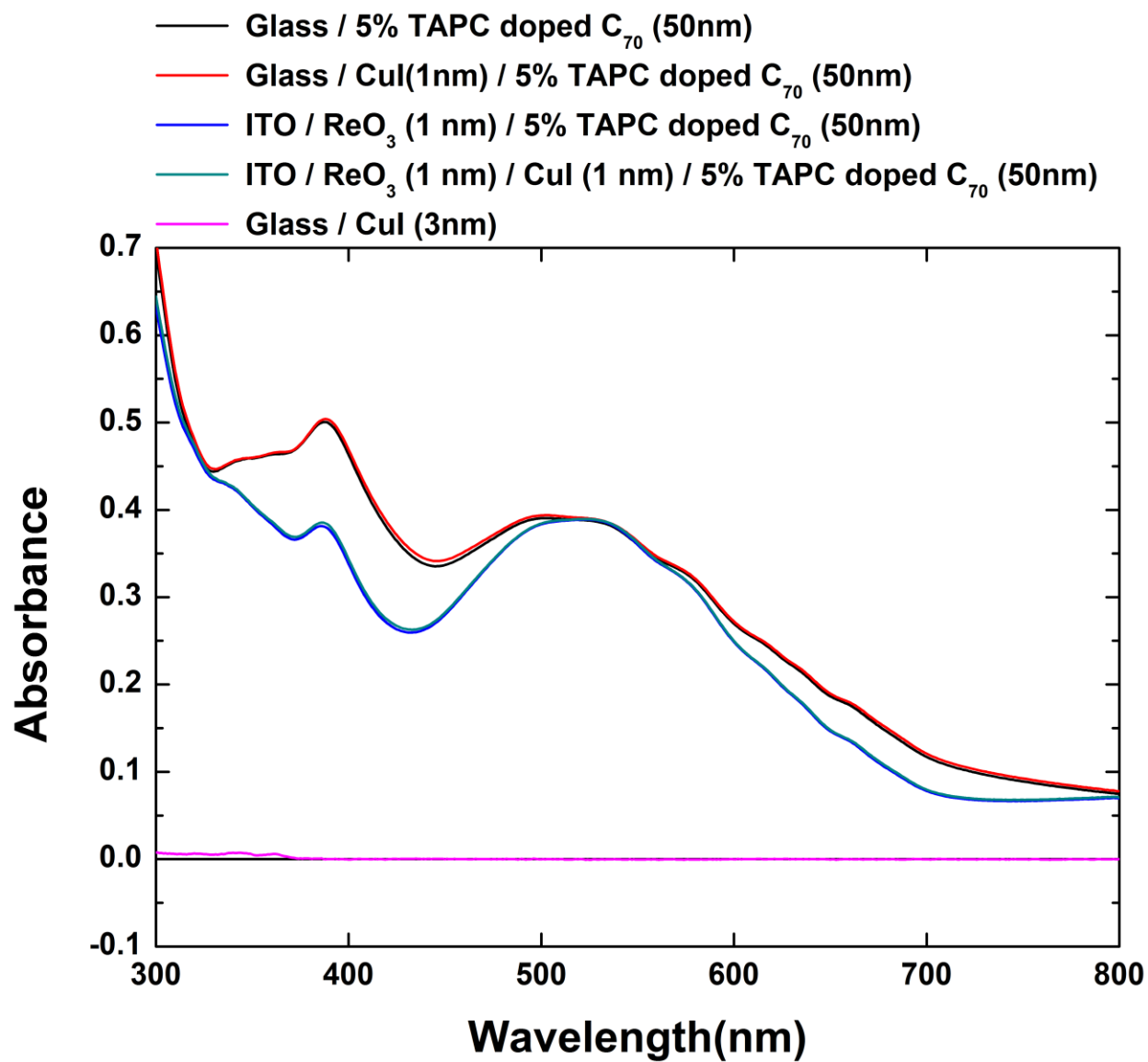


Figure S2. Absorption spectra of organic films. It is shown that optical properties of fullerene films remain with inserting CuI templating layer.

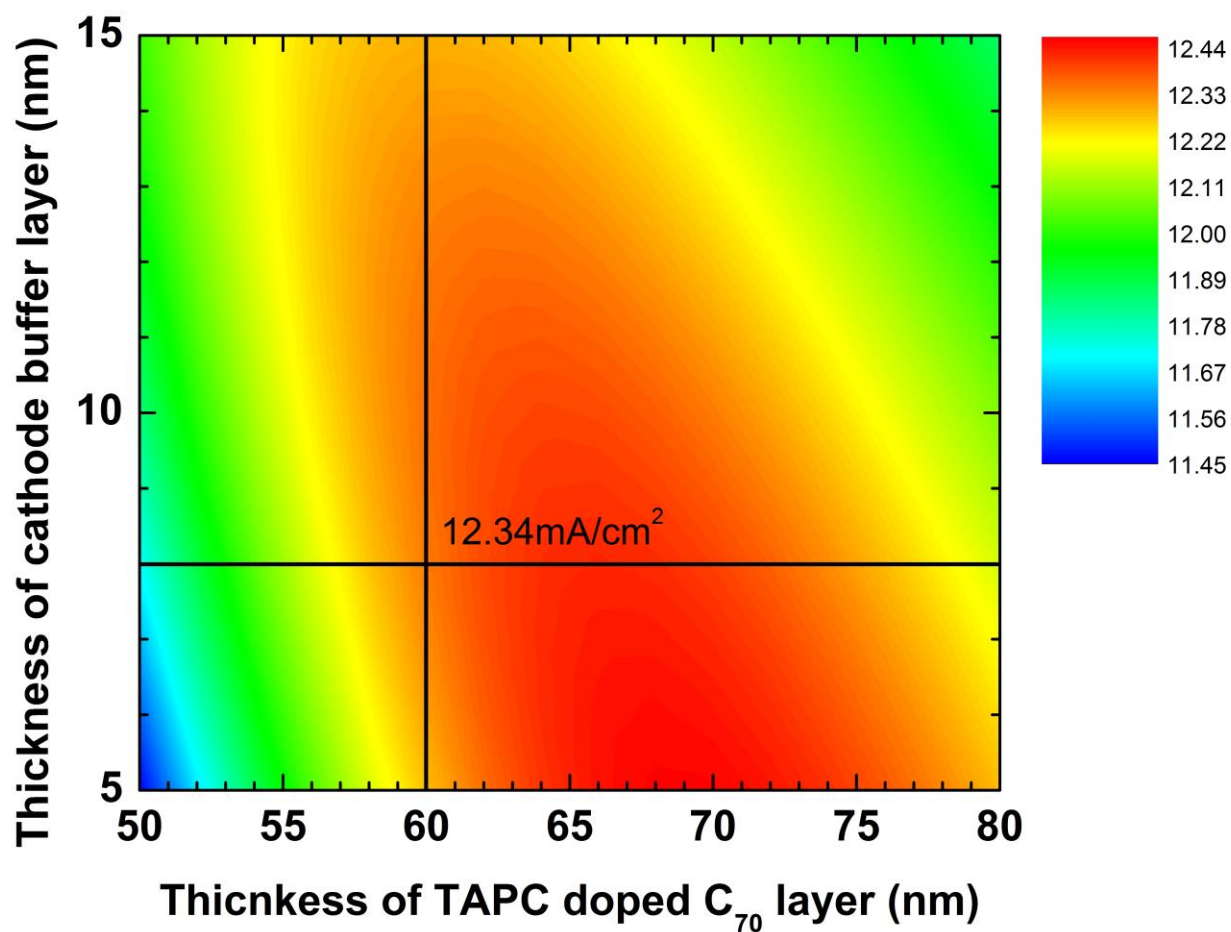


Figure S3. Calculated  $J_{SC}$  of ITO/5% TAPC doped  $C_{70}$ /BCP (cathode buffer layer)/Al (100 nm) by transfer matrix method. The 1 nm thick hole extraction layer can be negligible because the calculated  $J_{SC}$  with and without 1 nm thick  $\text{ReO}_3$  are  $12.61 \text{ mA/cm}^2$  and  $12.34 \text{ mA/cm}^2$  respectively and an error is less than 2%.

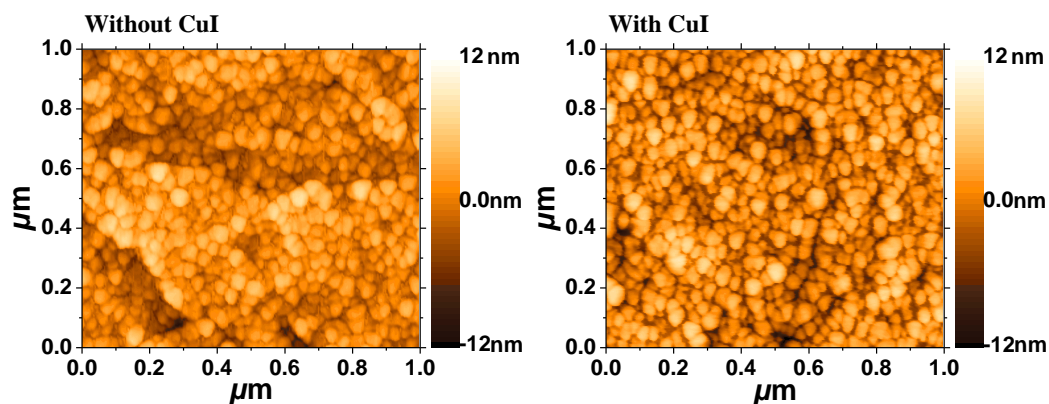


Figure S4. AFM images of the 50 nm thick 5% TAPC doped  $C_{70}$  film grown on ITO/ $ReO_3$ (1 nm) and ITO/ $ReO_3$ (1 nm)/CuI(1 nm). The size of image is  $1\ \mu m \times 1\ \mu m$ .

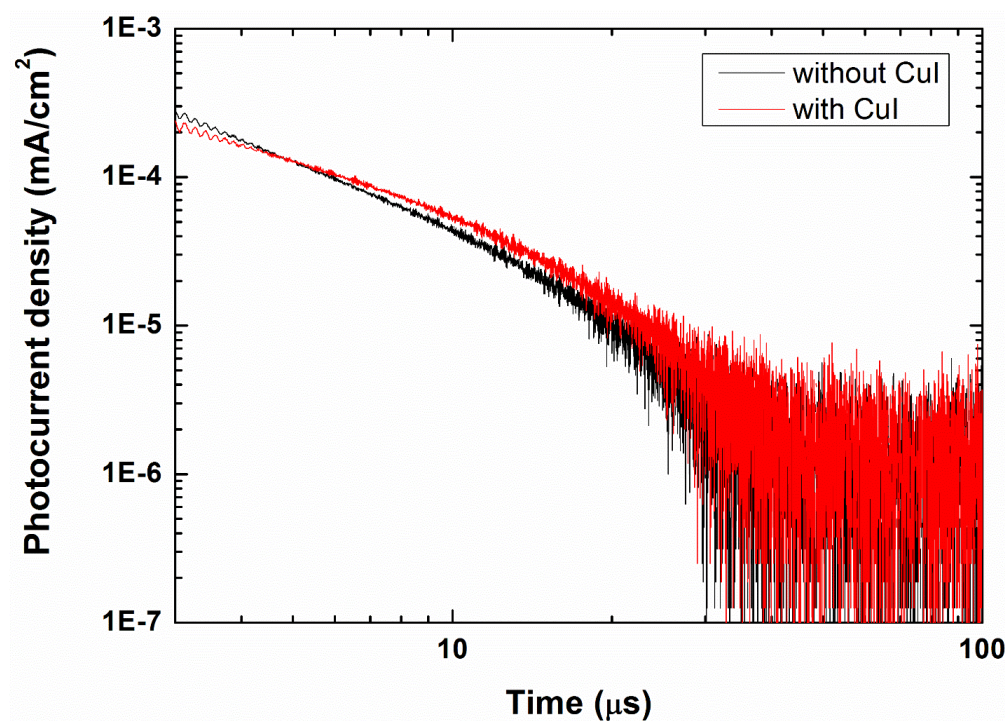


Figure S5. Transient photocurrent profiles measured at 298 K and for an electric field of  $2 \times 10^5$  V/cm. The device structures are: ITO (150 nm)/ with or without CuI (1 nm)/5% TAPC doped  $C_{70}$  (1000 nm)/Al (100 nm). The electron mobility increases with the introduction of CuI layer from  $3.35 \times 10^{-5} \text{ cm}^2/\text{Vs}$  to  $5.29 \times 10^{-5} \text{ cm}^2/\text{Vs}$ .