## CoSe<sub>2</sub>/Porous Carbon Shell composites as Highperformance Catalysts toward Tri-iodide Reduction in Dye-sensitized Solar Cells

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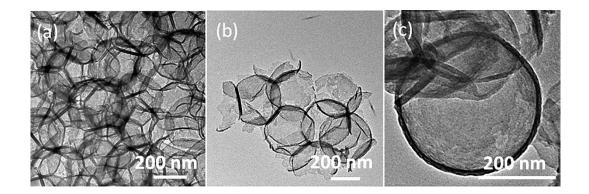


Figure S1. TEM images of blank carbon shell sample via carbonization at 800 °C

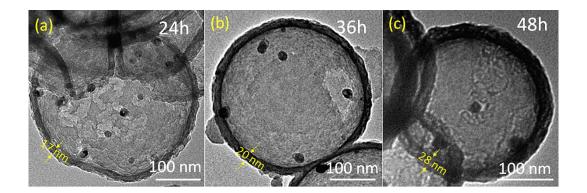


Figure S2. TEM images of CoSe<sub>2</sub>/CS sample prepared at different coating time

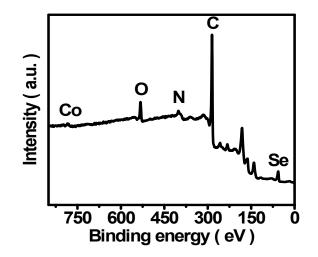


Figure S3. The XPS survey spectra of CoSe<sub>2</sub>/CS sample.

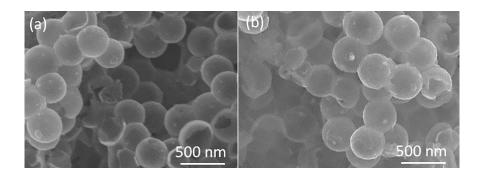


Figure S4 SEM image for  $CoSe_2/CS$ -based electrode before (a) and after (b) 100-cycle CV test.

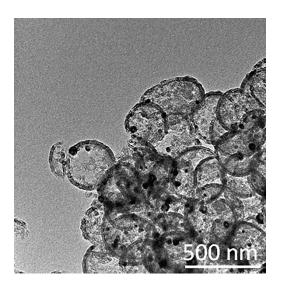


Figure S5 TEM image for CoSe<sub>2</sub>/CS sample prepared with 0.2 mmol Co(NO<sub>3</sub>)<sub>2</sub>.

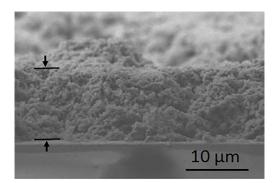


Figure S6 The cross-sectional SEM image of  $CoSe_2/CC$  film deposited on the FTO substrate