Electronic Supplementary Information

Performance improvement of Sb$_2$S$_3$-sensitized solar cell by introducing hole buffer layer in cobalt complex electrolyte

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**Fig. S1.** (a) TEM image of Sb$_2$S$_3$ deposited on mp-TiO$_2$, (b) EDX spectrum, and (c) XRD pattern of produced Sb$_2$S$_3$. (Cu came from copper grid for TEM)
**Fig. S2.** (a) Incident photon-to-current conversion efficiency (IPCE) of Sb$_2$S$_3$ sensitized solar cells with and without scattering layer, (b) their diffused reflectance spectra, (c) TEM image of nm-TiO$_2$, and (d) SEM image of TiO$_2$ for scattering layer.

**Fig. S3.** (a) J-V curves of mp-TiO$_2$/P3HT (P3HT sensitized solar cell) device and (b) its corresponding EQE spectrum.
Fig. S4. J-V curves of Sb$_2$S$_3$/N3 dye sensitized solar cell.