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Influence of yttrium dopant on the properties of anatase nanoparticles and the performance of dye-sensitized solar cells

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Measurement: The UV-Vis reflection spectra of X%Y-TiO_2 powder were measured by using a spectrophotometer (SHIMADZU, UV-2550) equipped with an integrating sphere setup. *IPCE* spectra were measured with monochromatic incident light of photon/cm^2 under 100mW/cm^2 white bias light in DC mode (PEC-S20, Peccell Co., Lid).

Table S1 Detail Crystallite size parameters calculated from 101, 200 and 211 diffraction peaks

Sample		**TiO_2**	**0.6%Y-TiO_2**	**1.8%Y-TiO_2**	**3%Y-TiO_2**	**4.2%Y-TiO_2**	**5.4%Y-TiO_2**
Crystallite size	**101**	29.48	27.32	26.92	26.31	27.22	26.63
calculated from	**200**	29.02	26.63	26.95	24.69	26.68	26.90
diffraction peak (nm)	**211**	26.73	27.75	24.67	24.34	24.77	28.13

Table S2 Corresponding interplanar spacing from 101 and 200 diffraction angles of TiO_2 and X%Y-TiO_2

Sample		**TiO_2**	**0.6%Y-TiO_2**	**1.8%Y-TiO_2**	**3%Y-TiO_2**	**4.2%Y-TiO_2**	**5.4%Y-TiO_2**
interplanar spacing	**101**	3.525	3.528	3.529	3.530	3.532	3.533
(Å)	**200**	1.897	1.898	1.898	1.898	1.899	1.899

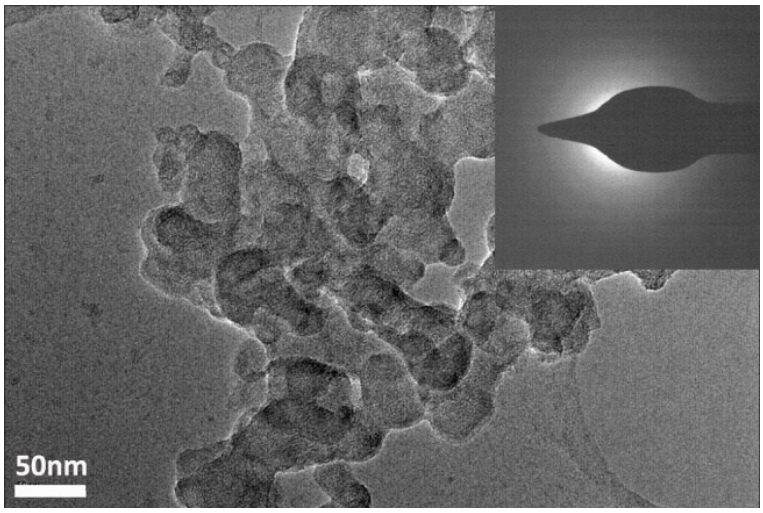

Fig. S1 TEM image of amorphous TiO_2. SAED pattern from the amorphous TiO_2 is shown as insets.

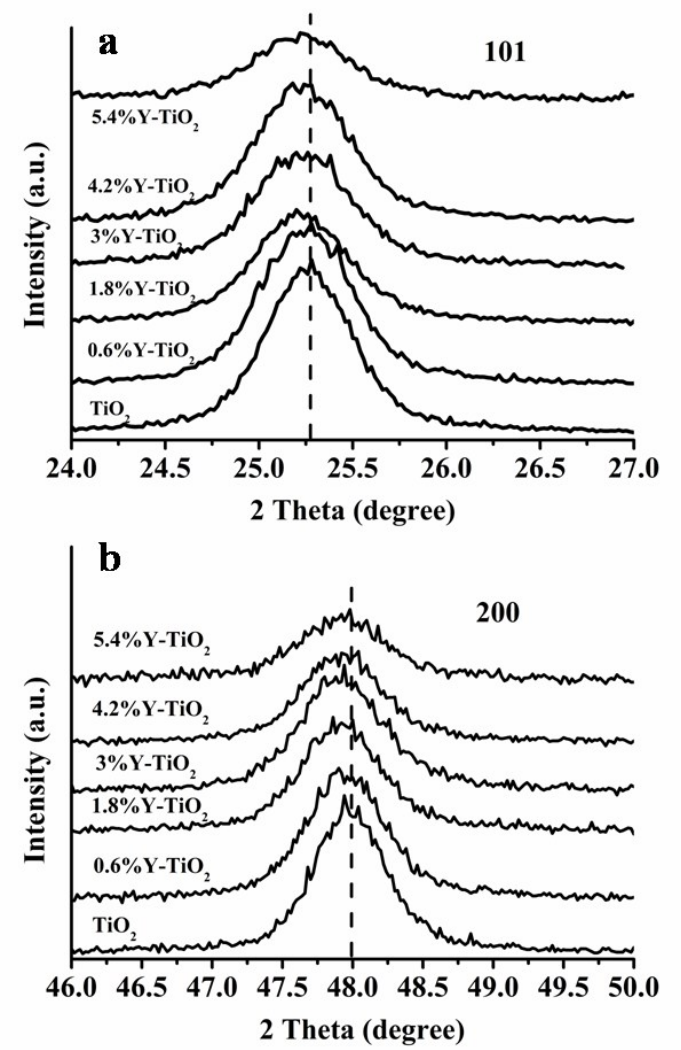

Fig. S2 XRD diffractogram of anatase peak 101 and 200

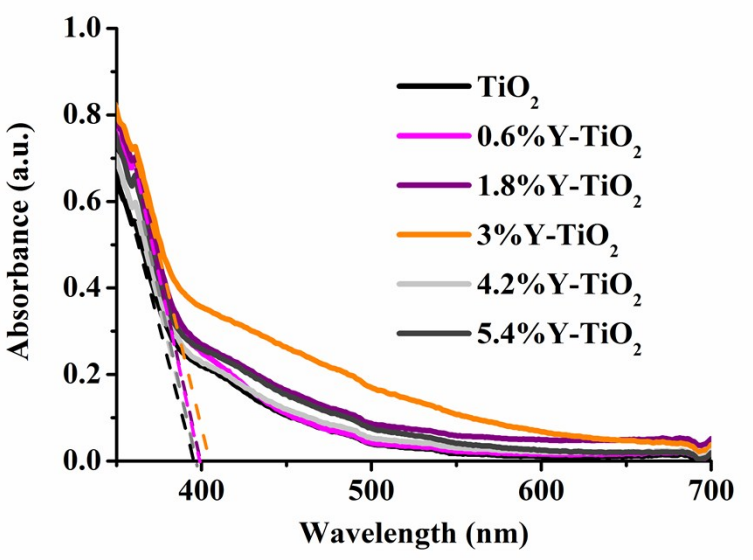

Fig. S3 UV–Vis spectra of as-prepared TiO_2, X%Y-TiO_2 *NPs*

Experimental UV-Vis spectra of as-prepared TiO_2 and X%Y-TiO_2 are shown in Fig. S3. The absorption edge of Y-doped TiO_2 is substantially red shifted to visible region. The absorption edges of as-prepared TiO_2 and X%Y-TiO_2 appeared at 395-399 nm, corresponding band gap energies are listed in Table 1.

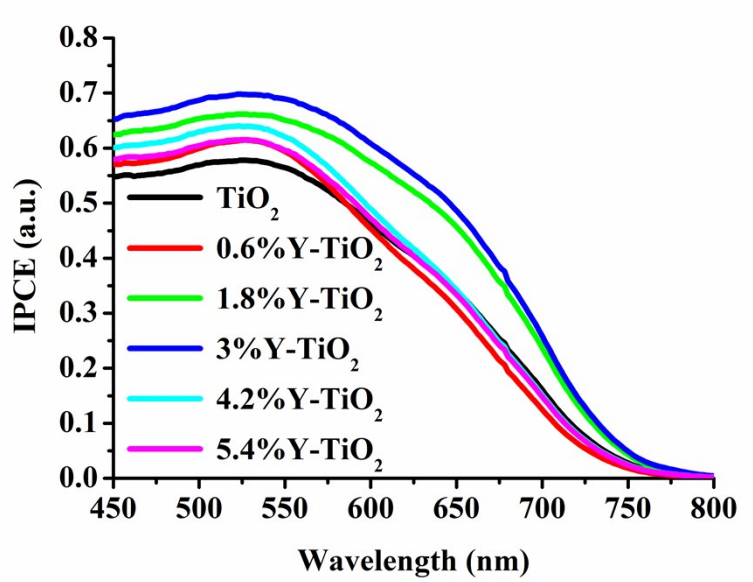

Fig. S4 *IPCE* spectra of TiO_2 and X%Y-TiO_2 based *DSSCs*