

**Electronic supplementary information (ESI)**

**Interfacial Modification on the Working Electrode of Dye-  
Sensitized Solar Cell to Improve the Charge Transport  
Properties**

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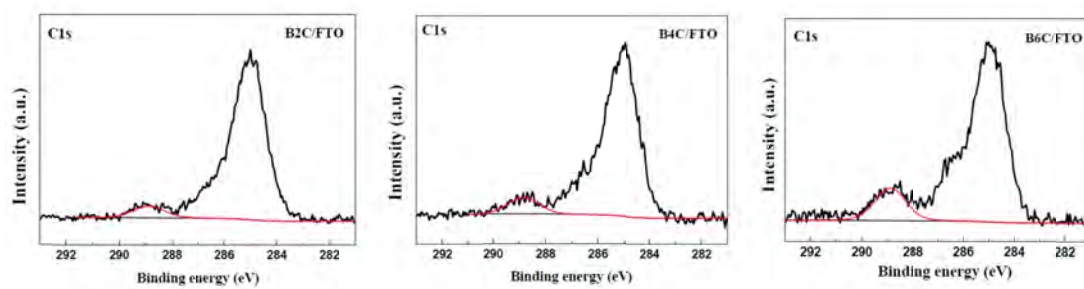
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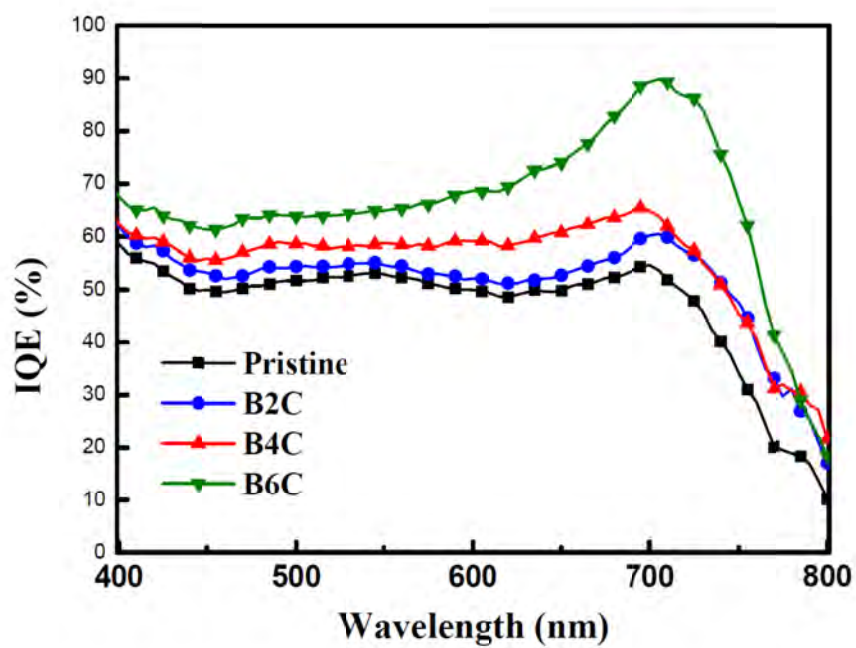
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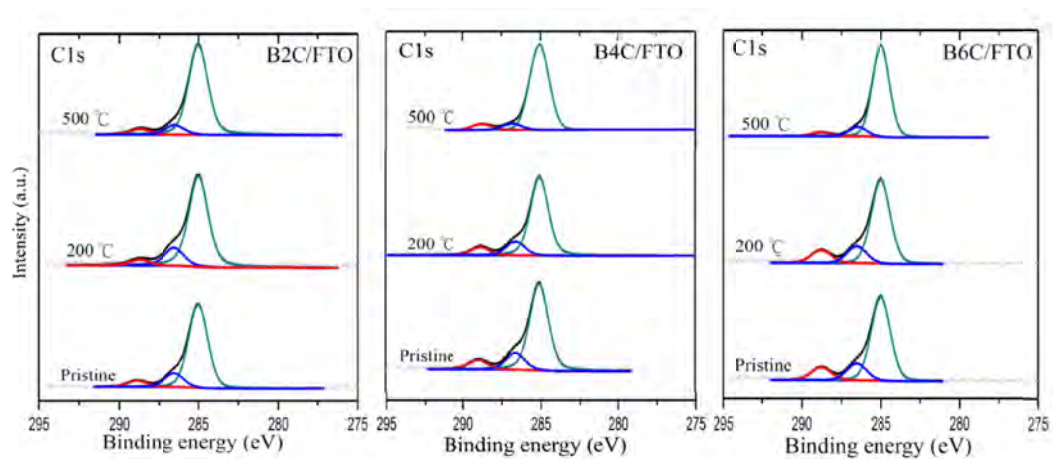


C1s	B2C	B4C	B6C
Free -COOH / Total Carbon	0.073	0.1	0.183

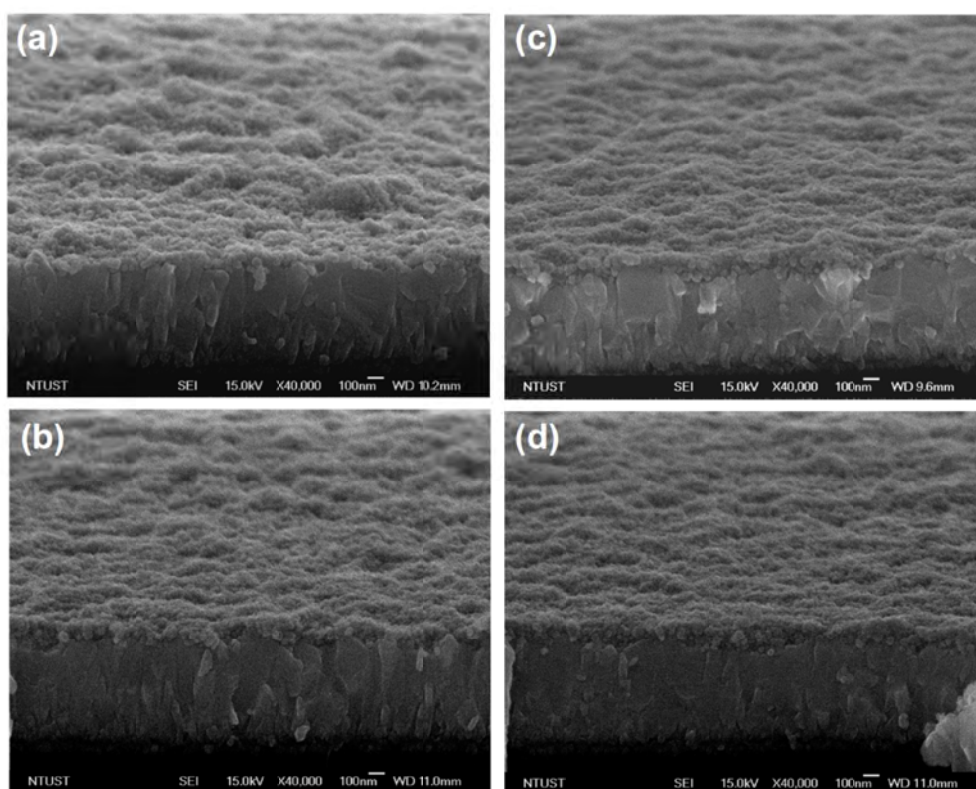
**Figure S1.** C1s XPS spectra of B2C, B4C, and B6C fabricated on FTO. The peak intensity ratio of free -COOH to the total carbon are summaries in the table.



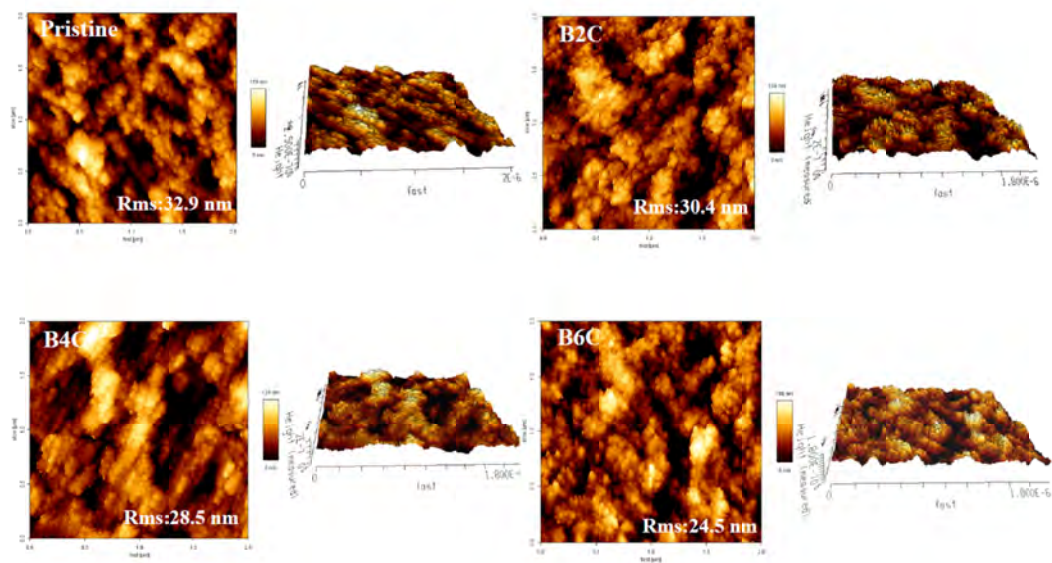
**Figure S2.** Internal quantum efficiency, calculated from the UV-Vis and EQE, of the pristine and SAMs modified DSSC. The enhancement at  $\sim 700$  nm for B6C was due to small changes at the absorption tail of the dye molecules.



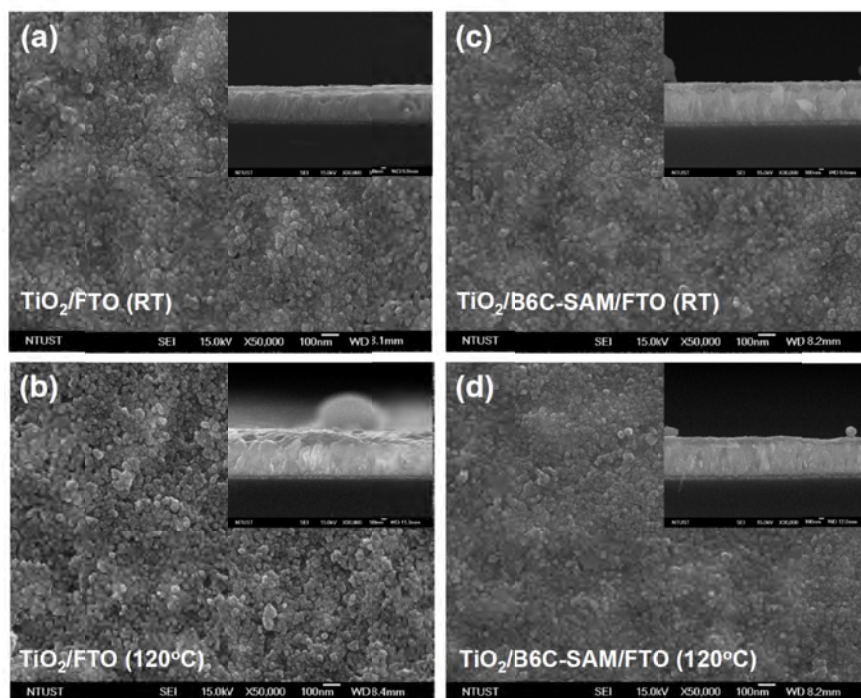
**Figure S3.** C1s XPS spectra of B2C, B4C, and B6C fabricated on FTO at room temperature (Pristine) and sintered at different temperatures.



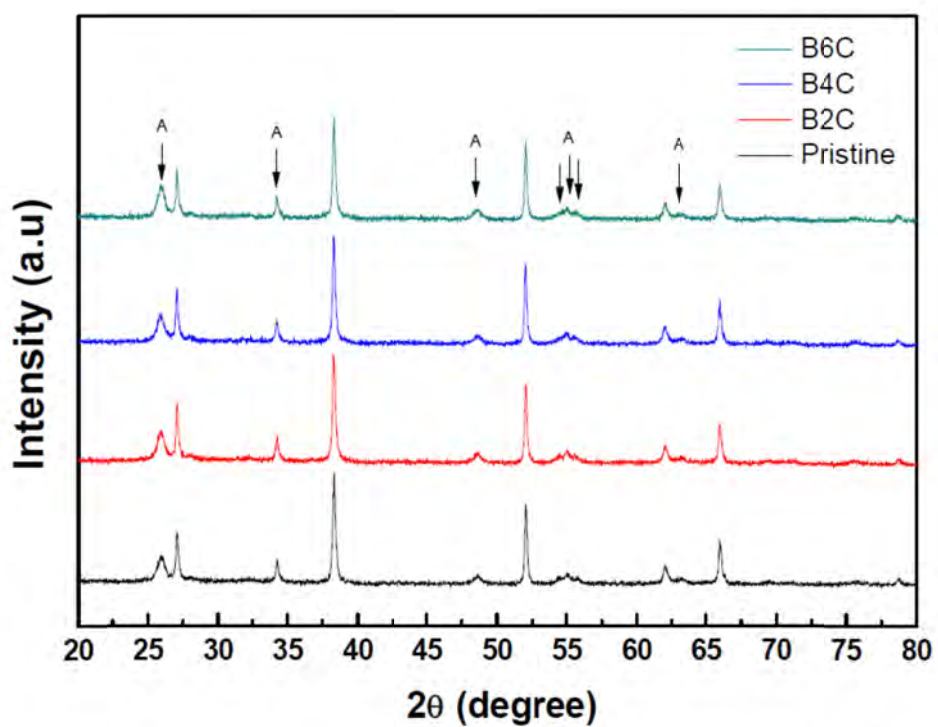
**Figure S4.** SEM Cross-sectional images of the 150 nm TiO<sub>2</sub> initial layer fabricated on (a) pristine, (b) B2C, (c) B4C, and (d) B6C modified FTO surfaces.



**Figure S5.** AFM image and surface roughness of 150 nm TiO<sub>2</sub> initial layers fabricated on pristine and SAMs modified FTO.

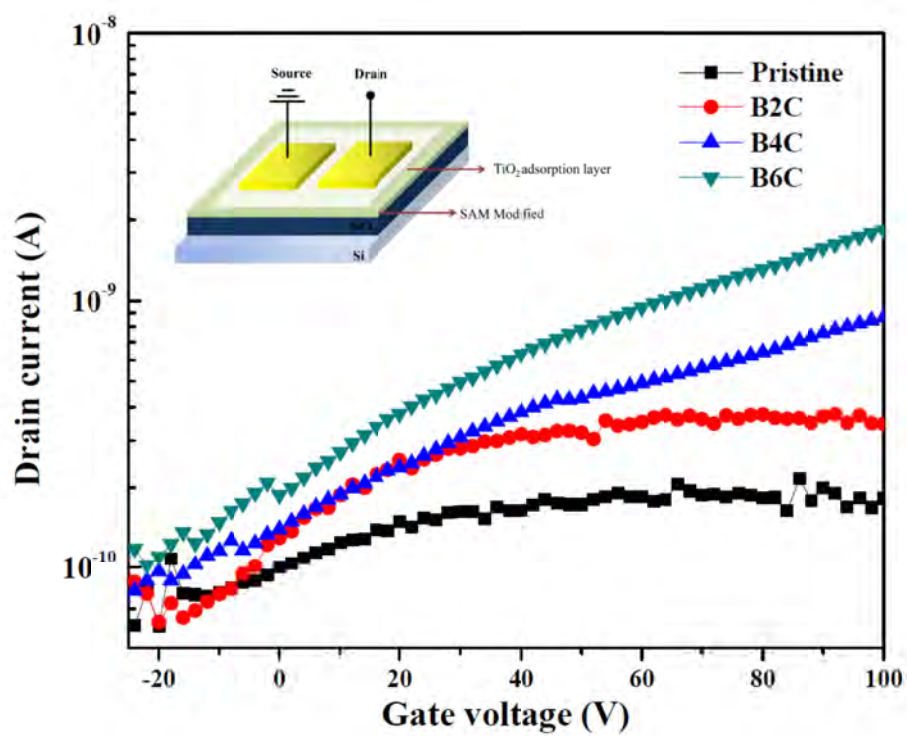


**Figure S6.** SEM images of  $\sim 150$  nm  $\text{TiO}_2$  initial layer fabricated on pristine (a)(b) and B6C (c)(d) modified FTO surfaces in room temperature and after sintered at  $120^\circ\text{C}$  for 1 h, respectively.

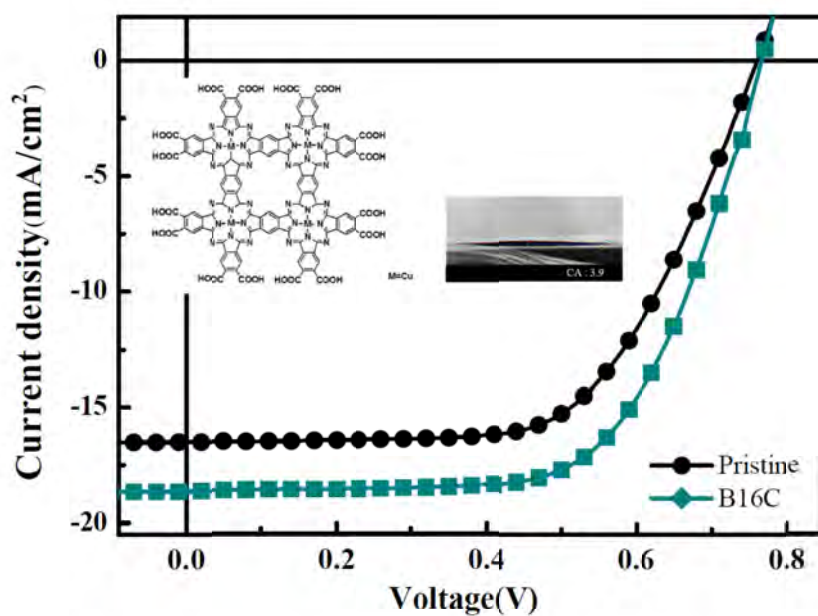


**Figure S7.** XRD profiles of TiO<sub>2</sub> initial layers on pristine and SAMs modified FTO.





**Figure S8.** Electron mobilities of the  $\text{TiO}_2$  initial layers fabricated on pristine and B2C, B4C, and B6C modified  $\text{SiO}_2$  measured with a transistor structure.



	J <sub>sc</sub> (mA/cm <sup>2</sup> )	V <sub>oc</sub> (V)	Efficiency (%)	FF(%)	R <sub>s</sub> (Ω*cm <sup>2</sup> )
Pristine	16.50 (±0.13)	0.77 (±0.01)	7.70 (±0.12)	61.02 (±0.31)	8.93 (±0.11)
B16C	18.64 (±0.15)	0.77 (±0.00)	9.14 (±0.09)	63.70 (±0.38)	6.82 (±0.08)

**Figure S9.** Photocurrent density–voltage characteristics of pristine and B16C SAM modified DSSC, with the molecule structure of B16C and water contact angle of B16C/FTO surface in the inset.

**Table S1** Summary of device parameters of Pristine, plasma-treated, and SAMs-  
modified DSSC

	<b>Jsc (mA/cm<sup>2</sup>)</b>	<b>Voc (V)</b>	<b>Efficiency (%)</b>	<b>FF (%)</b>	<b>Rs (Ω*cm<sup>2</sup>)</b>
<b>Pristine</b>	16.50 (±0.13)	0.77 (±0.01)	7.70 (±0.12)	61.02 (±0.31)	8.93 (±0.11)
<b>B2C</b>	17.00 (±0.09)	0.77 (±0.00)	7.99 (±0.21)	61.03 (±0.33)	8.37 (±0.06)
<b>Plasma</b>	<b>17.28 (±0.14)</b>	<b>0.78 (±0.01)</b>	<b>8.04 (±0.13)</b>	<b>59.66 (±0.40)</b>	<b>10.29 (±0.22)</b>
<b>B4C</b>	17.65 (±0.11)	0.76 (±0.00)	8.29 (±0.13)	61.80 (±0.61)	8.12 (±0.07)
<b>B6C</b>	18.29 (±0.08)	0.77 (±0.00)	8.73 (±0.17)	61.72 (±0.59)	7.88 (±0.04)