Electronic Supplementary Information

Highly photoactive SnO_2 nanostructures engineered by electrochemically a ctive biofilm

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Schematic representation of modification process of pure SnO_2 (*p*-SnO_2) nanostructures by EAB

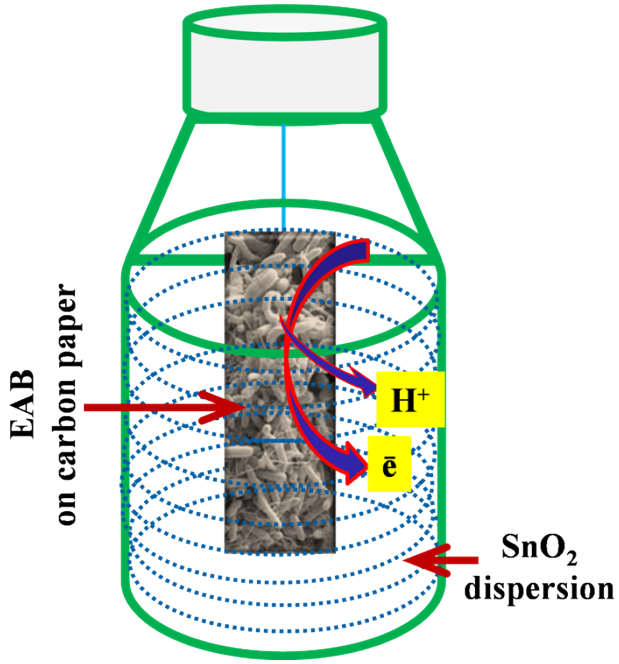

Fig. S1. Schematic representation of the SnO_2 nanostructures modification by electrochemical ly active biofilm.

Adsorption-desorption equilibrium spectra of 4-NP only, 4-NP with *p*-SnO_2 and 4-NP with *m*-SnO_2 nanostructures

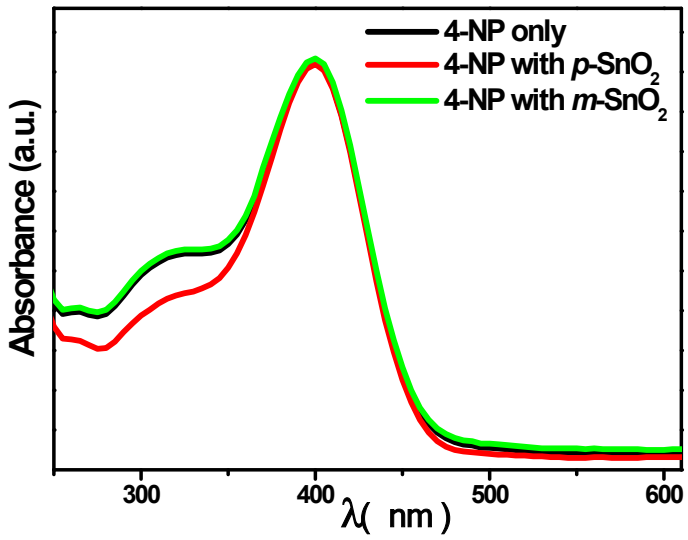

Fig. S2. Adsorption-desorption equilibrium spectra of 4-NP only, 4-NP with *p*-SnO_2 and 4-NP with *m*-SnO_2 nanostructures.

Adsorption-desorption equilibrium spectra of MB only, MB with *p*-SnO_2 and MB with *m*-SnO_2 nanostructures

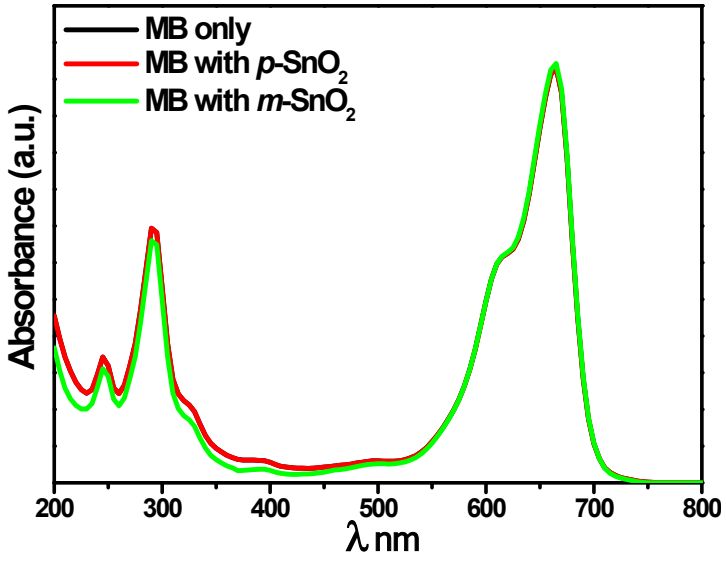

Fig. S3. Adsorption-desorption equilibrium spectra of MB only, MB with *p*-SnO_2 and MB with *m*-SnO_2 nanostructures.

Dark reaction (with catalyst, 3 h) spectra of 4-NP only, 4-NP with *p*-SnO_2 and 4-NP with *m*-SnO_2 nanostructures

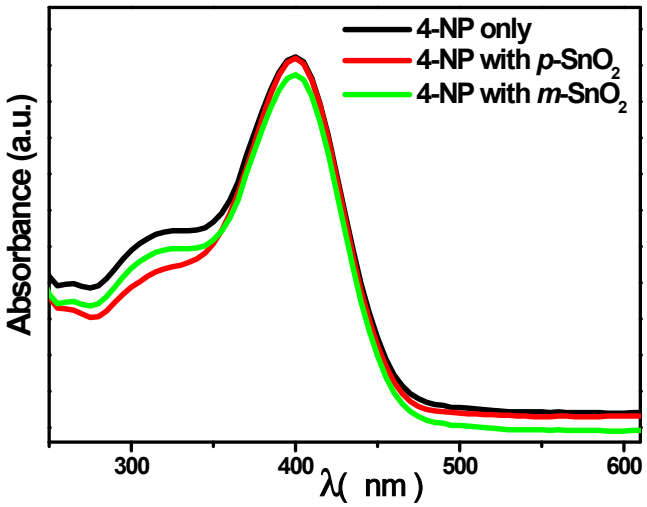

Fig. S4. Dark reaction (with catalyst, 3 h) spectra of 4-NP only, 4-NP with *p*-SnO_2 and 4-NP with *m*-SnO_2 nanostructures.

Dark reaction (with catalyst, 3 h) spectra of MB only, MB with *p*-SnO_2 and MB with *m*-SnO_2 nanostructures

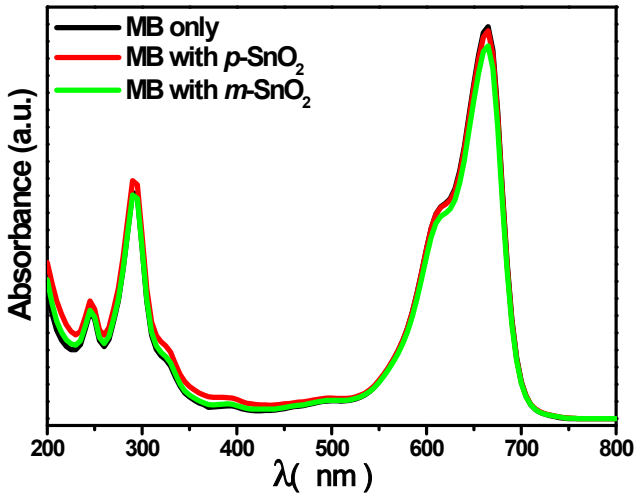

Fig. S5. Dark reaction (with catalyst, 3 h) spectra of MB only, MB with *p*-SnO_2 and MB with *m*-SnO_2 nanostructures.

Light reaction (without catalyst, 3 h) spectra of 4-NP only, 4-NP with *p*-SnO_2 and 4-NP with *m*-SnO_2 nanostructures

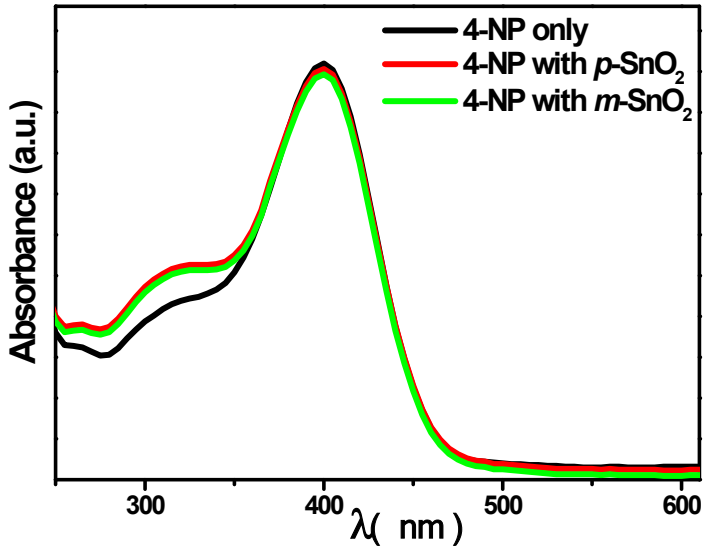

Fig. S6. Light reaction (without catalyst, 3 h) spectra of 4-NP only, 4-NP with *p*-SnO_2 and 4-NP with *m*-SnO_2 nanostructures.

Light reaction (without catalyst, 3 h) spectra of MB only, MB with *p*-SnO_2 and MB with *m*-SnO_2 nanostructures

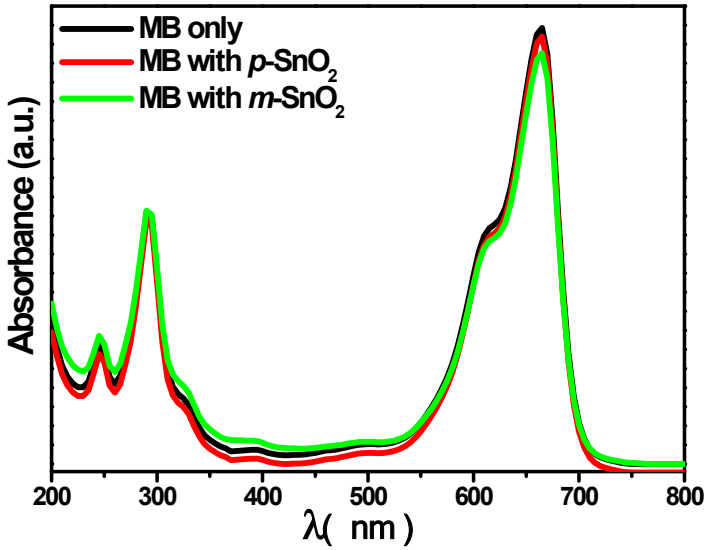

Fig. S7. Light reaction (without catalyst, 3 h) spectra of MB only, MB with *p*-SnO_2 and MB with *m*-SnO_2 nanostructures.

UV-vis diffuse reflectance spectra of the *p*-SnO_2 and *m*-SnO_2 nanostructures

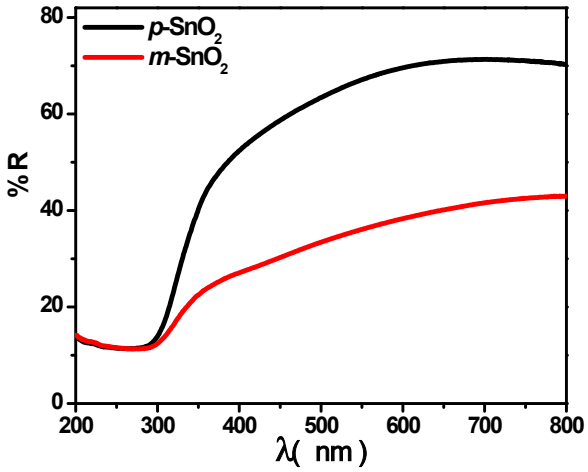

Fig. S8. UV-vis diffuse reflectance spectra of the *p*-SnO_2 and *m*-SnO_2 nnanostructures.

XPS survey spectra of the *p*-SnO_2 and *m*-SnO_2 nanostructures

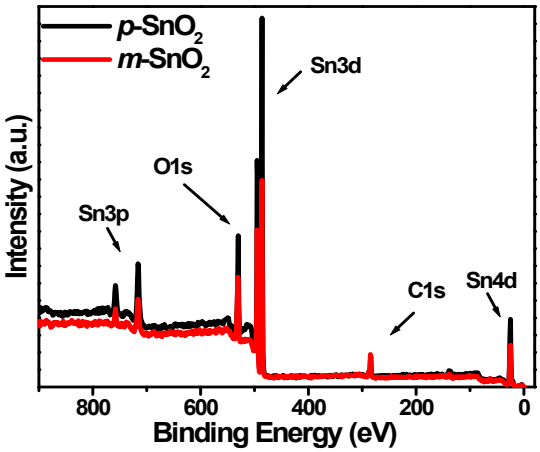

Fig. S9. XPS survey spectra of the *p*-SnO_2 and *m*-SnO_2 nanostructures.

SAED patterns of the *p*-SnO_2 nanostructures

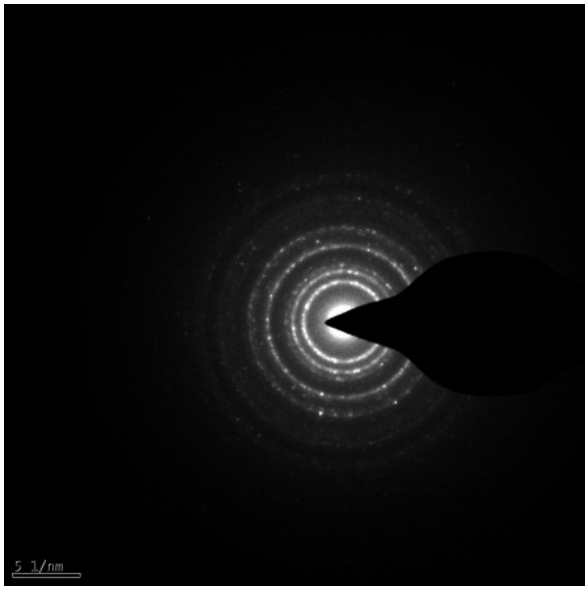

Fig. S10. SAED patterns of the *p*-SnO_2 nanostructures.

SAED patterns of the *m*-SnO_2 nanostructures

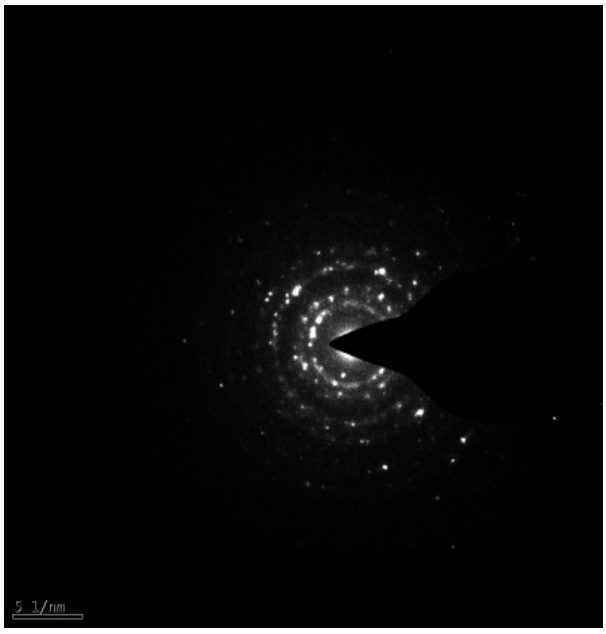

Fig. S11. SAED patterns of the *m*-SnO_2 nanostructures.

Acquire HAADF of the *p*-SnO_2 nanostructures

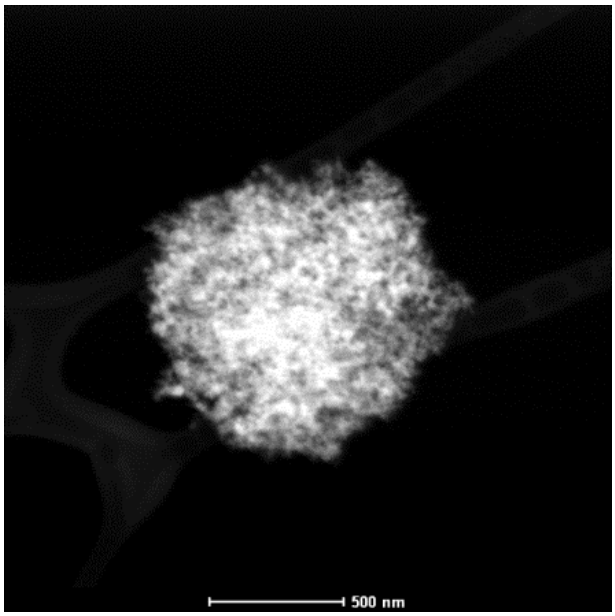

Fig. S12. Representative HAADF FE-TEM image of the *p*-SnO_2 nanostructures.

Acquire HAADF of the *m*-SnO_2 nanostructures

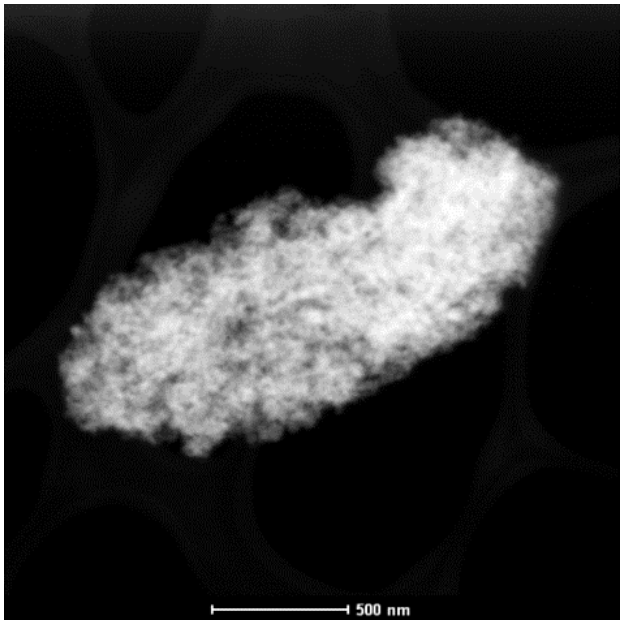

Fig. S13. Representative HAADF FE-TEM image of the *m*-SnO_2 nanostructures.

EDX of the *p*-SnO_2 nanostructures

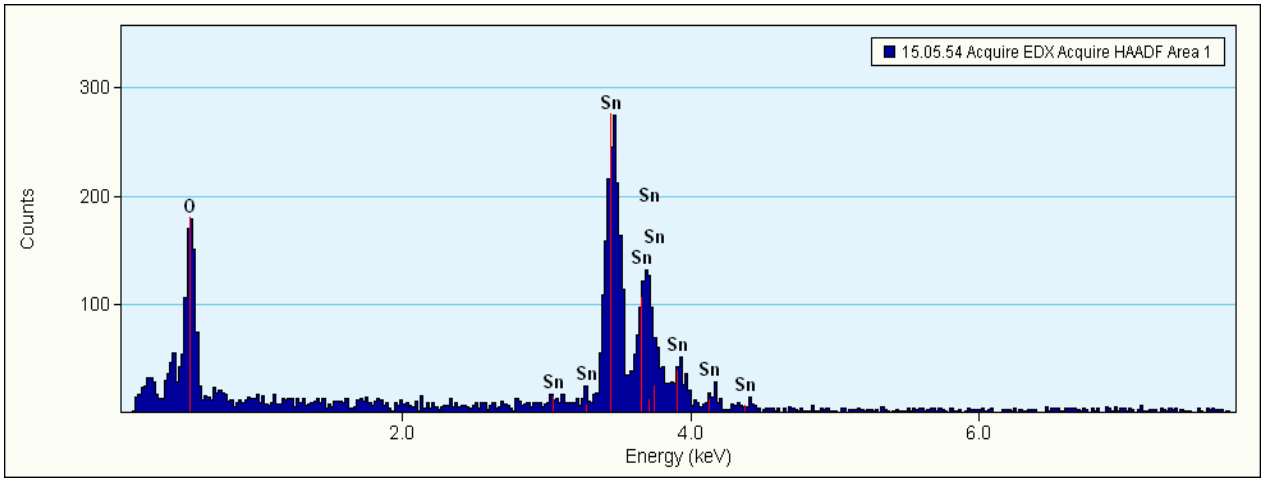

Fig. S14. EDX of the *p*-SnO_2 nanostructures.

EDX of the *m*-SnO_2 nanostructures

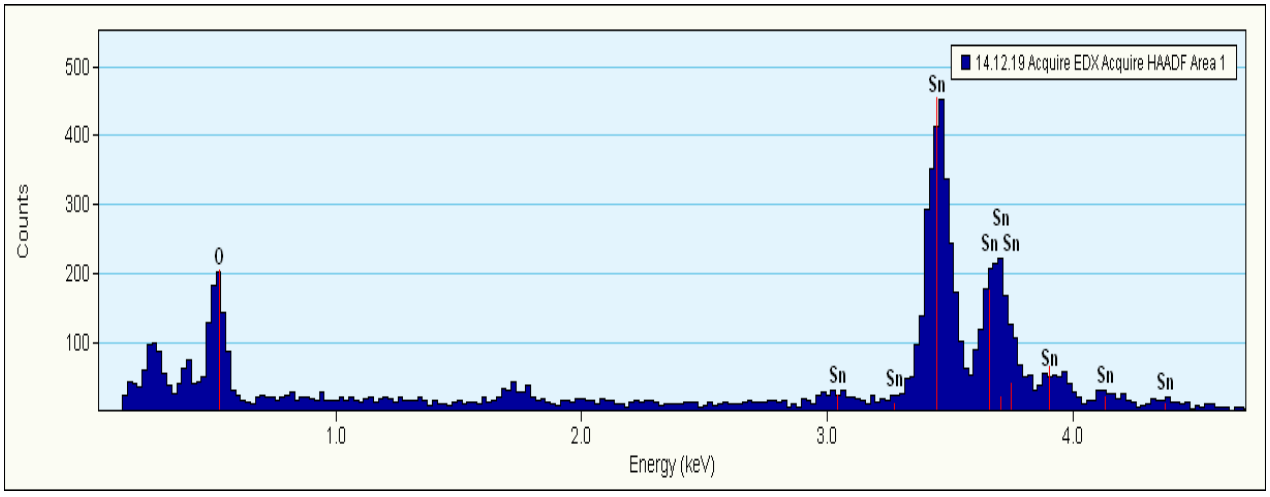

Fig. S15. EDX of the *m*-SnO_2 nanostructures.

Reaction kinetics of the degradation of 4-NP and MB

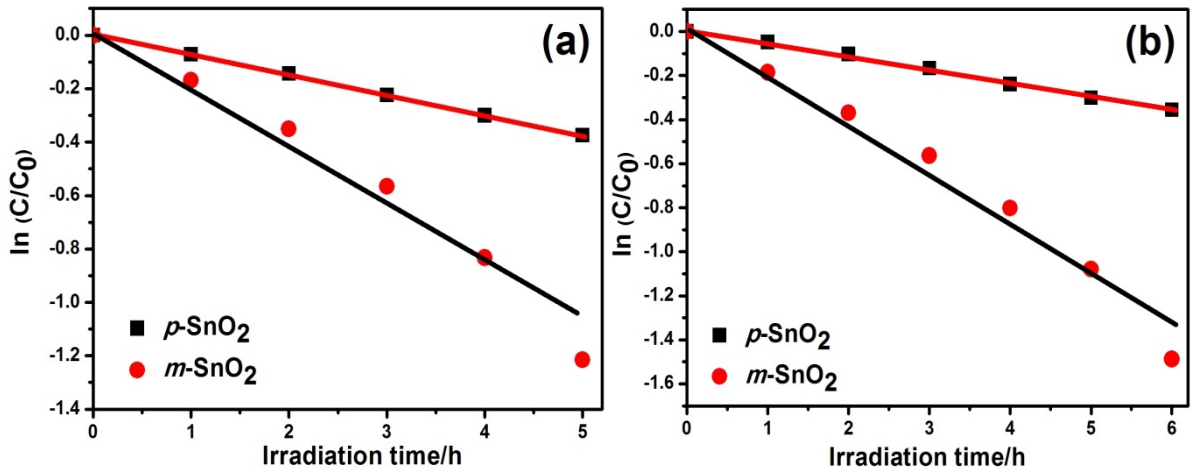

Fig. S16. Kinetics and linear fit spectra for the degradation of (a) 4-NP and, (b) MB with *p*-S nO_2 and *m*-SnO_2 nanostructures.

Table S1. Pseudo-first order rate constants

Photocatalyst	Dye	$k\ (h^{-1})$	R^2
p-SnO_2	4-NP	0.0714	0.9995
m-SnO_2	4-NP	0.2081	0.9710
p-SnO_2	MB	0.0481	0.9966
m-SnO_2	MB	0.2157	0.9722