Supporting Information

Photo-Fenton-induced selectively dehydrogenative coupling of methanol into ethylene glycol over iron species anchored TiO_2 nanorods

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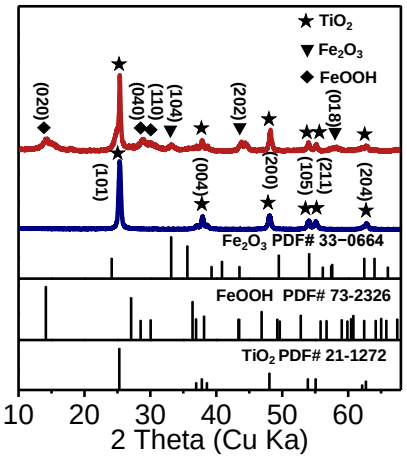

Fig. S1 XRD pattern of pristine TiO_2 nanorods and TiO_2/FeO_x nanorods

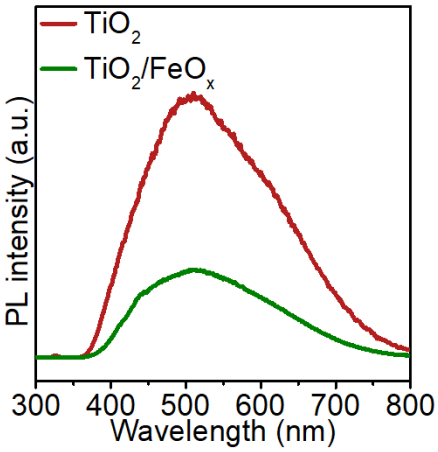

Fig. S2 Photoluminescence spectra of TiO_2 nanorods and TiO_2/FeO_x nanorods

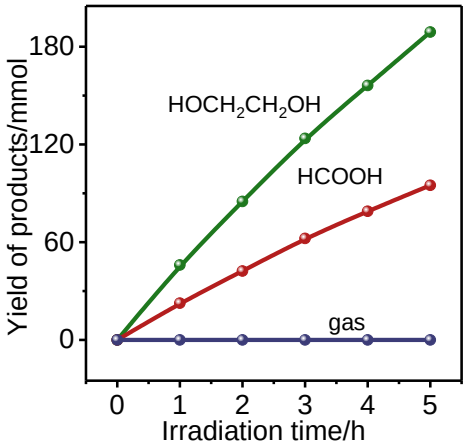

Fig. S3 Yield of products for the photocatalytic conversion of methanol as a function of the reaction time (30 % aqueous H_2O_2 fed at 5 mL/h)

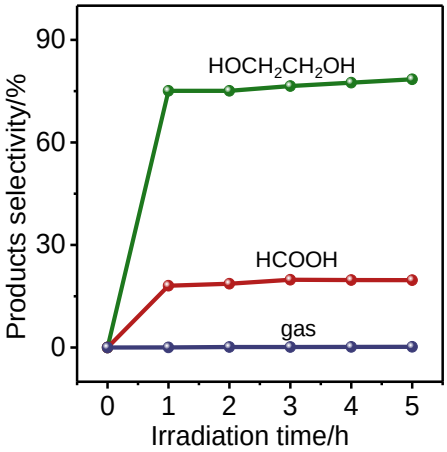

Fig. S4 Selectivity of products for the photocatalytic conversion of methanol as a function of the reaction time (30 % aqueous H_2O_2 fed at 5 mL/h)

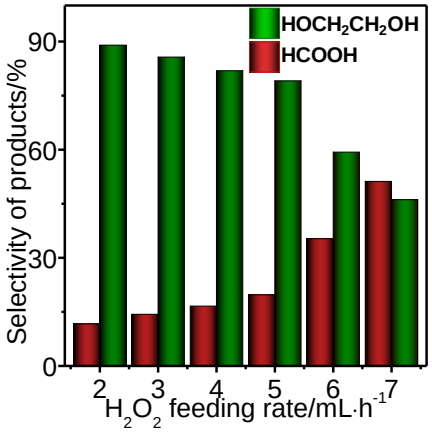

Fig. S5 Effect of H_2O_2 feeding rate on the selectivity of products

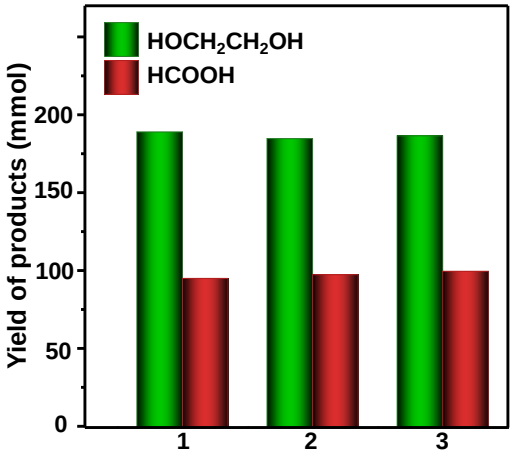

Fig. S6 Recycling test of the photocatalytic conversion of methanol

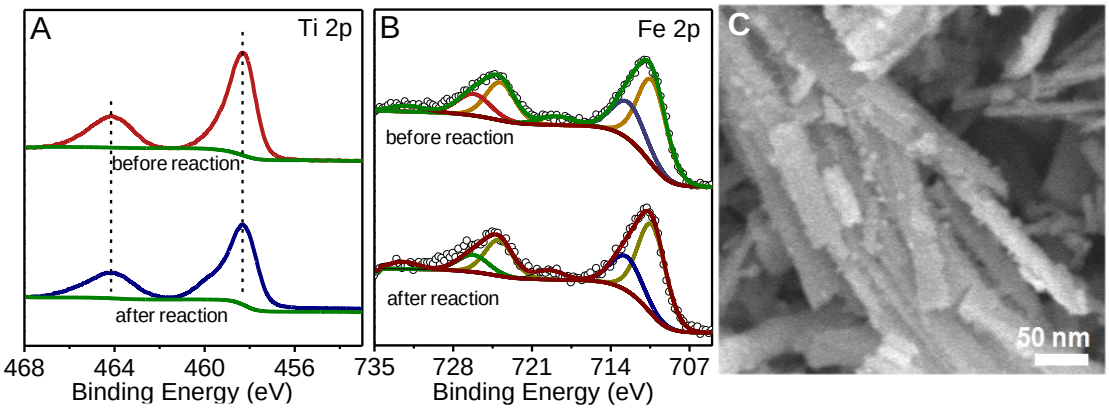

Fig. S7 (A) Ti 2p narrow spectra, (B) Fe 2p XPS narrow spectra of TiO_2/FeO_x nanorods before and after cycling stability test and (C) SEM images of TiO_2/FeO_x nanorods after cycling stability test (**Fig. S6**).

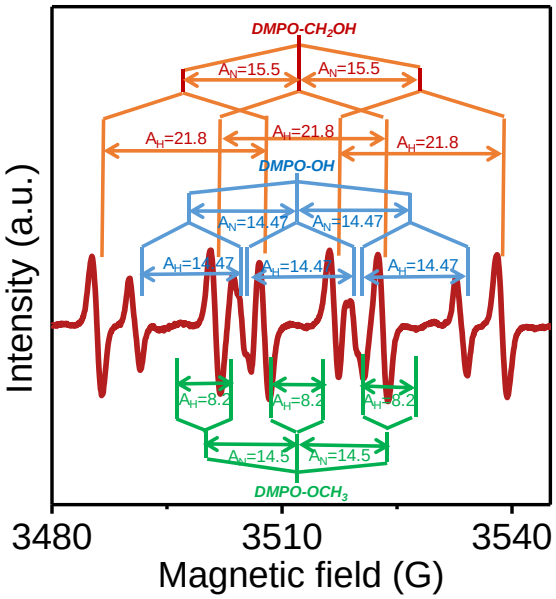

Fig. S8 In situ EPR spectra of radical adducts trapped by DMPO in the methanol solution containing H_2O_2 over TiO_2/FeO_x nanorods under UV irradiation

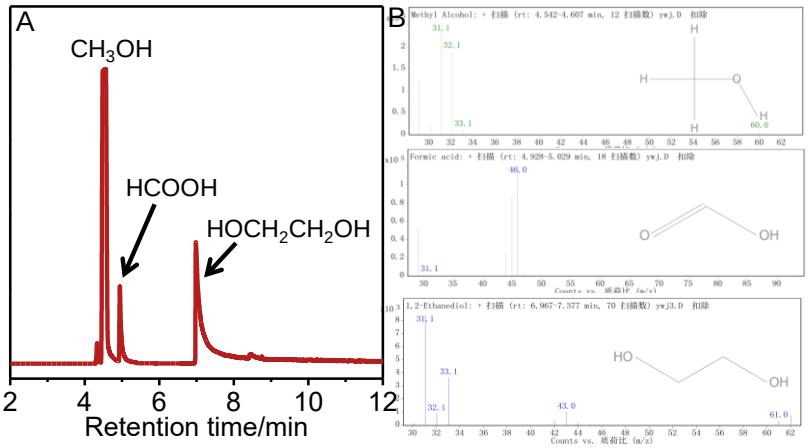

Fig. S9 (A) Gas chromatogram and (B) Mass spectra of the products formed for the photocatalytic conversion of methanol

Table S1 Experimental data for the photocatalytic C–C coupling of methanol

catalyst	H_2O_2 feeding rate mmol/h	amount of ·OH mmol	Formation rate (mmol/h)			Selectivity (%)			H_2O_2 utilization efficiency	Methanol Conversion rate mmol/ h
			EG	HCOOH	minor products	EG	HCOOH	minor products		
TiO_2/FeO_x	5	98.0	37.8	18.0	0.19	79.1	18.8	0.2	77.1	95.5
TiO_2/FeO_x	6	117.5	32.1	32.6	3.44	63.4	32.2	3.4	54.6	101.1