Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting information

TiO_2-supported copper nanoparticles prepared via ion exchange for hydrogen production

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Characteristics of copper titanate and Cu/TiO_2 photocatalysts

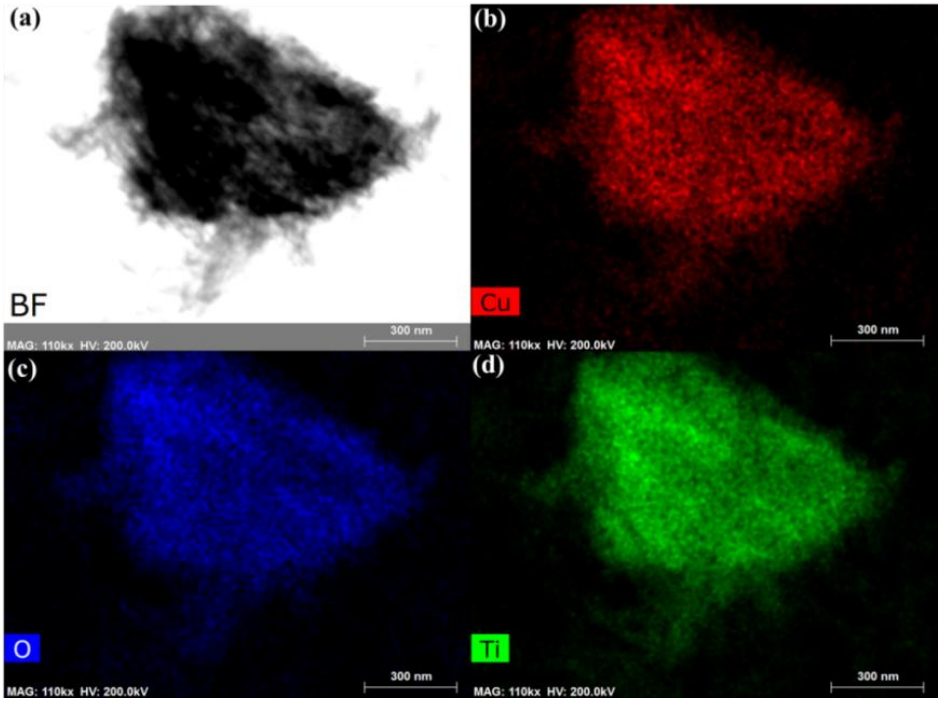

Figure S1. EDX compositional mapping analysis for ion-exchanged copper titanate: (a) TEM image used for EDX analysis; (b) Cu element mapping; (c) O element mapping; and (d) Ti element mapping.

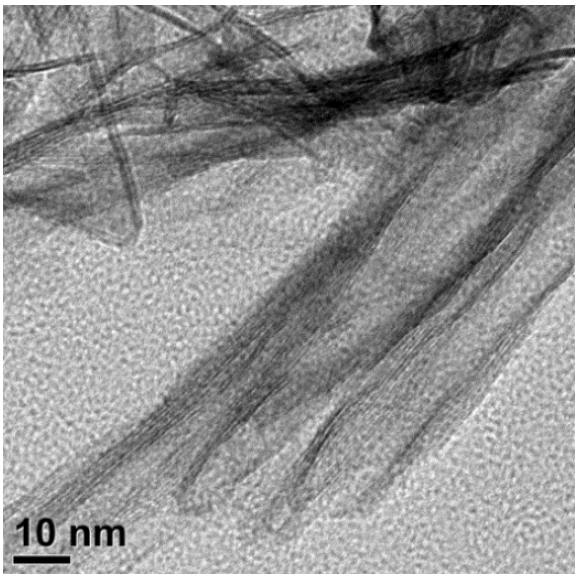

Figure S2. HRTEM image of sodium titanate.

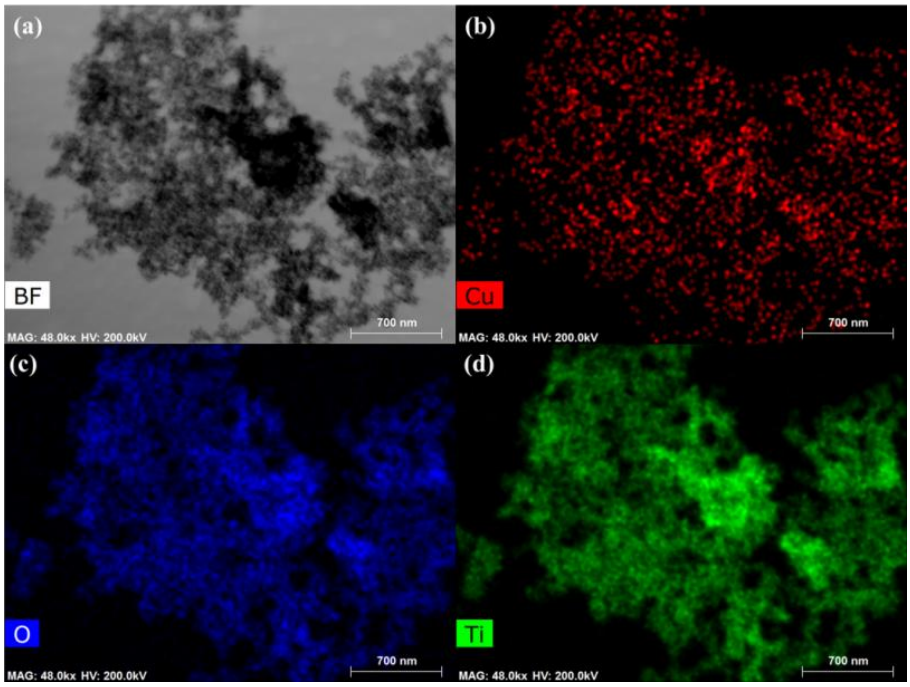

Figure S3. EDX compositional mapping analysis for IE Cu/TiO_2: (a) TEM images used for EDX analysis; (b) Cu element mapping; (c) O element mapping; and (d) Ti element mapping.

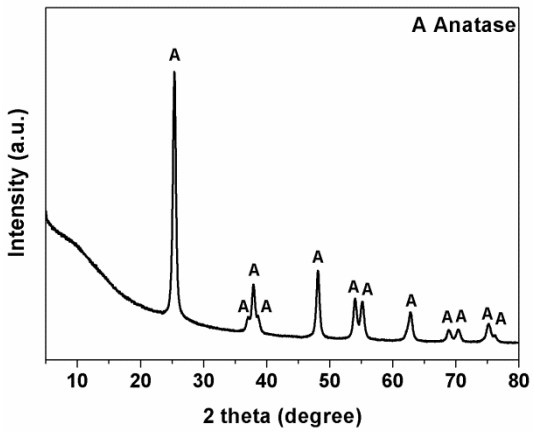

Figure S4. XRD pattern of neat IE TiO_2 particles derived from calcining hydrogen titanate. The hydrogen titanate was produced by exchanging H^+ with Na^+ in sodium titanate.

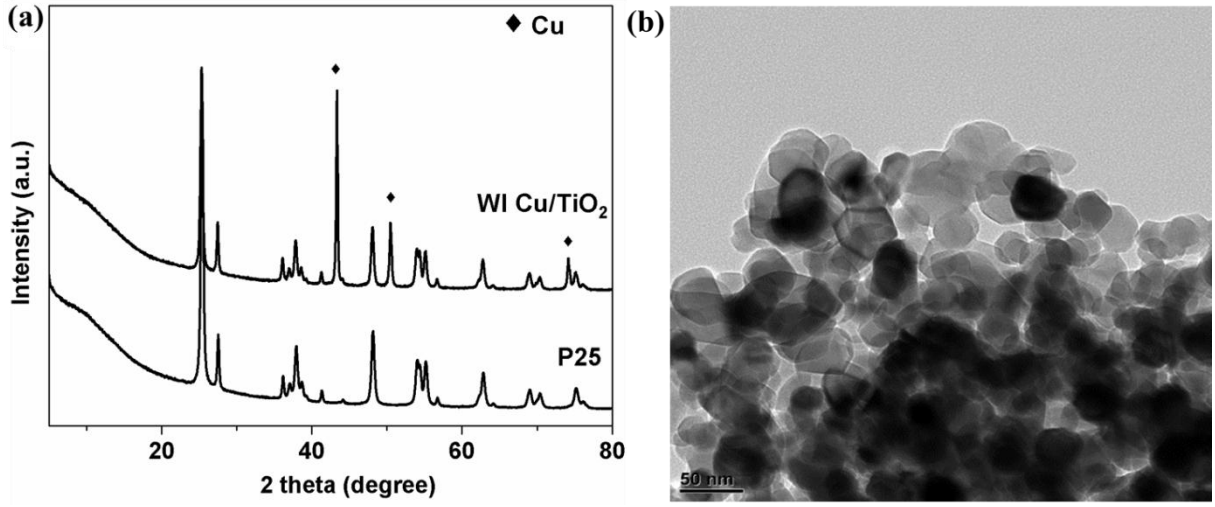

Figure S5. (a) XRD patterns of P25 and WI Cu/TiO_2; (b) TEM image of WI Cu/TiO_2.

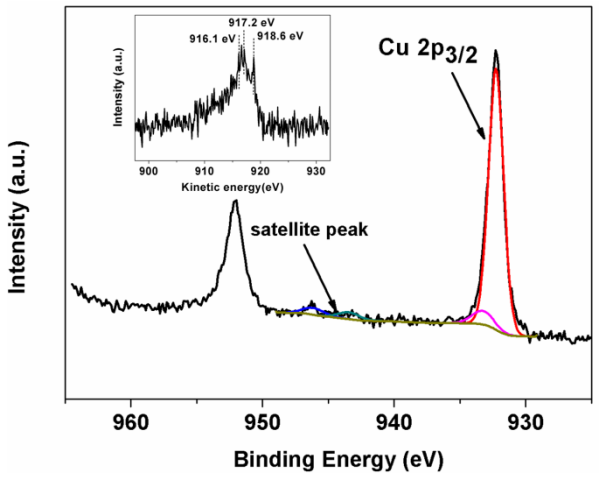

Figure S6. XPS profile showing Cu 2p core level peaks for WI Cu/TiO_2. Insert depicts Cu LMM Auger spectra of WI Cu/TiO_2.

Table S1. Concentrations of Cu^{2+} in solution for IE Cu/TiO_2 and WI Cu/TiO_2 after each cycle for three sequential photocatalytic hydrogen production reaction cycles. 'Total copper' represents the copper concentration in solution if all the copper was dissolved from the Cu/TiO_2 surface.

	Copper ion concentration (mg/L)	
	IE Cu/TiO_2	WI Cu/TiO_2
Before reaction	0.18±0.05	0.16±0.05
Cycle 1	1.56±0.05	2.69±0.05
Cycle 2	1.67±0.05	2.87±0.05
Cycle 3	1.62±0.05	2.67±0.05
Total copper	189	184