

Plasmonic coinage metal-TiO₂ hybrid nanocatalysts for highly efficient photocatalytic oxidation under sunlight irradiation

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Fig.S1

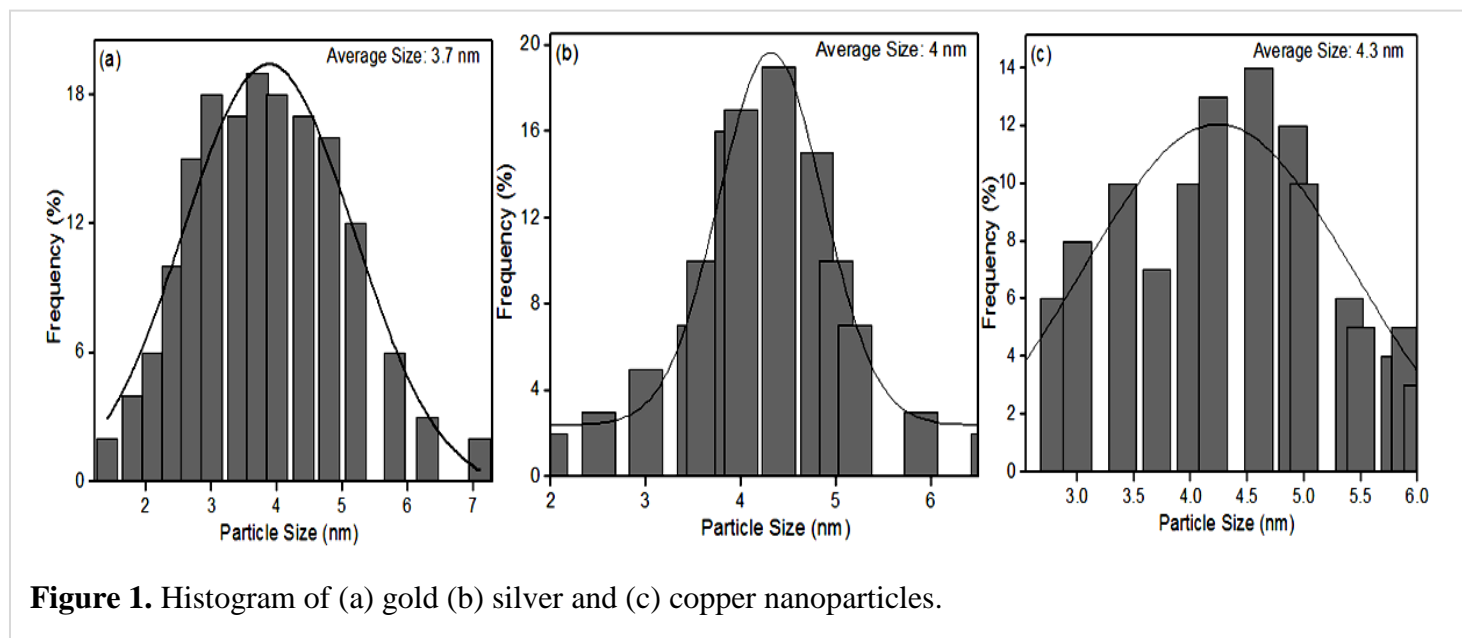


Figure 1. Histogram of (a) gold (b) silver and (c) copper nanoparticles.

Fig.S2

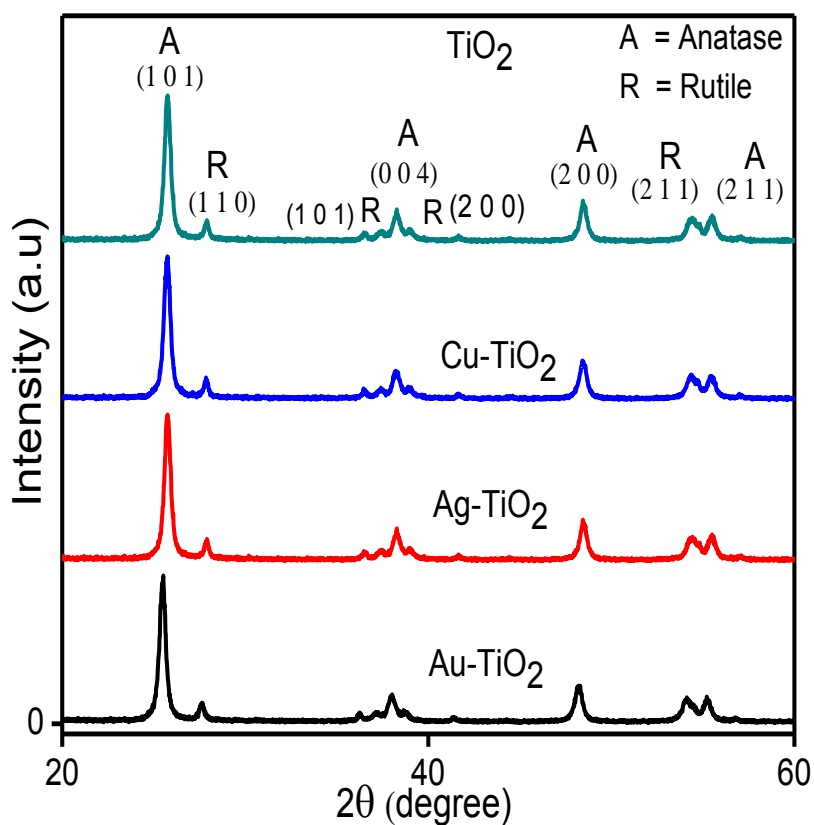


Figure 2: XRD patterns of TiO₂ (P25) and M-TiO₂ composites with loading of 1 wt% coinage metal nanoparticles.

Fig. S3

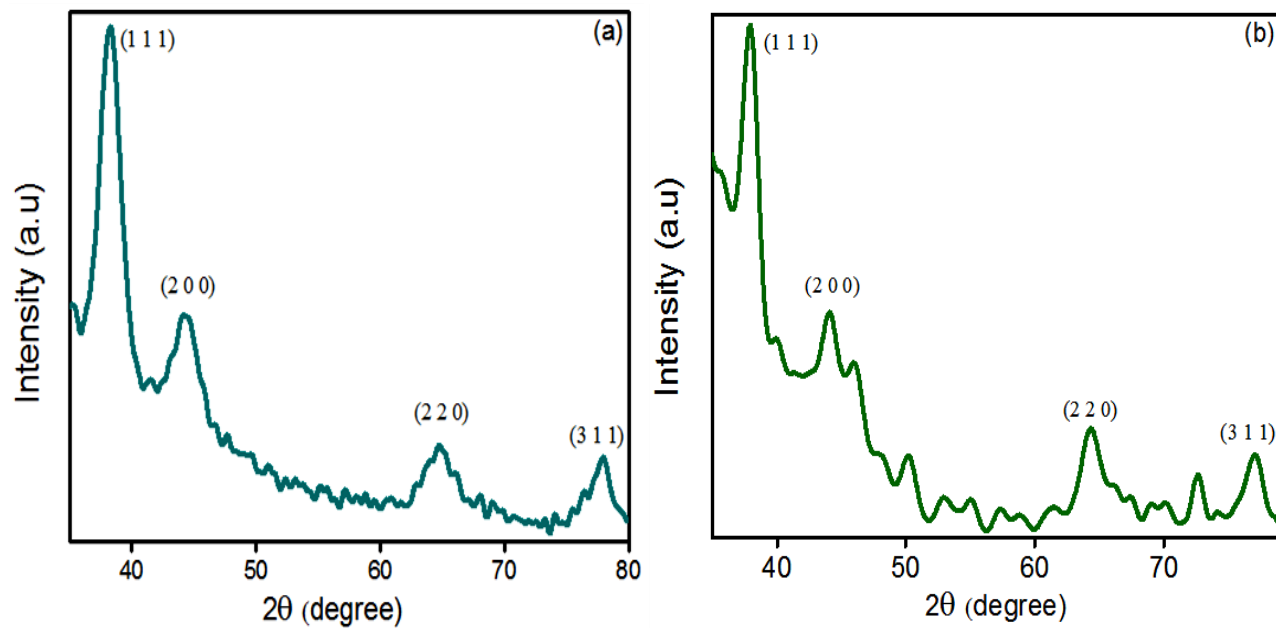


Figure 3: XRD patterns of freeze dried (a) Au and (b) Ag metal nanoparticles.

Fig. S4

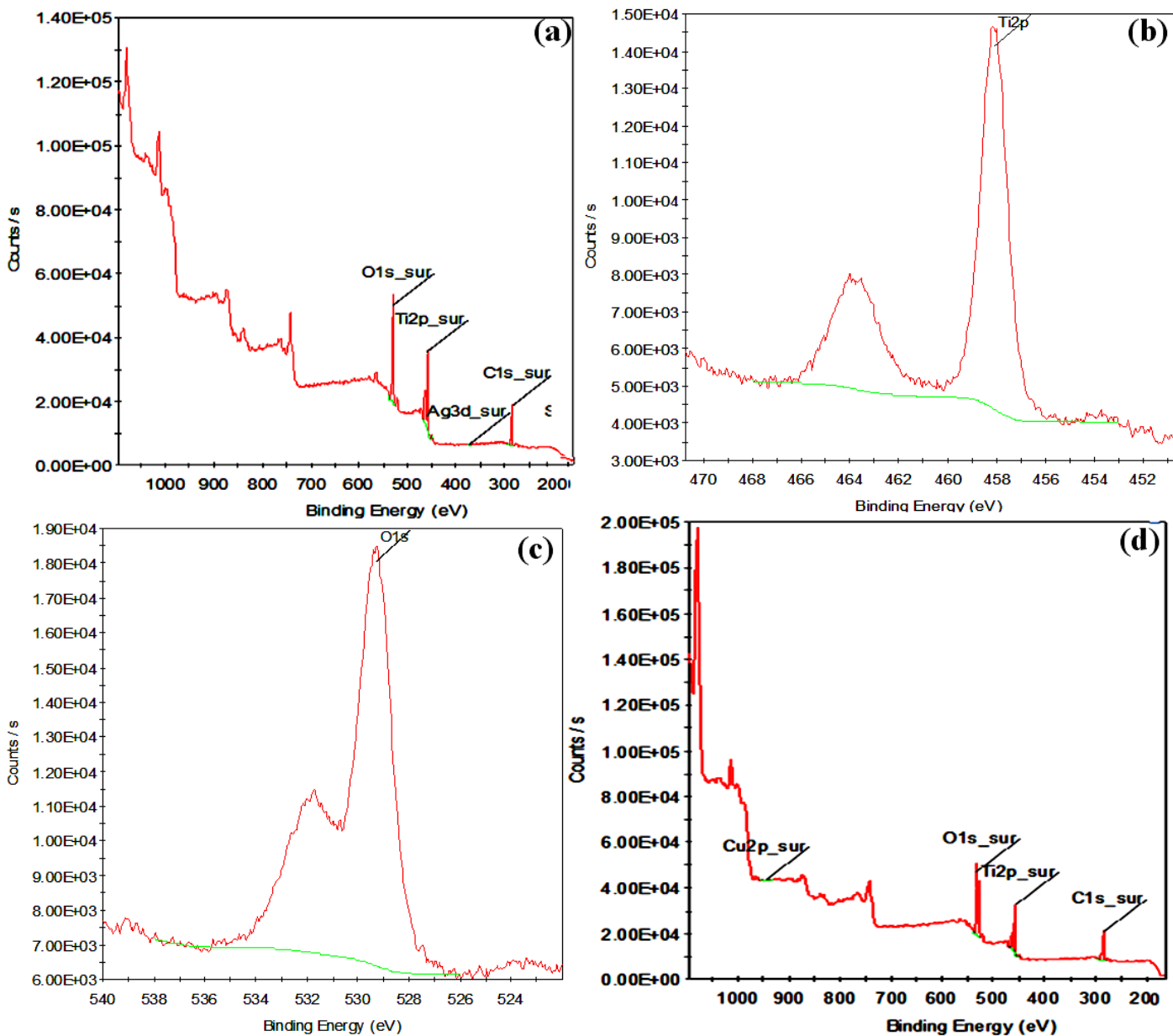


Figure 4: (a) Full spectrum XPS of Ag-TiO₂ nanocomposite (b) XPS spectrum of Ti2p, (c) O1s, and (d) Full XPS of Cu-TiO₂ nanocomposite.

Fig. S5

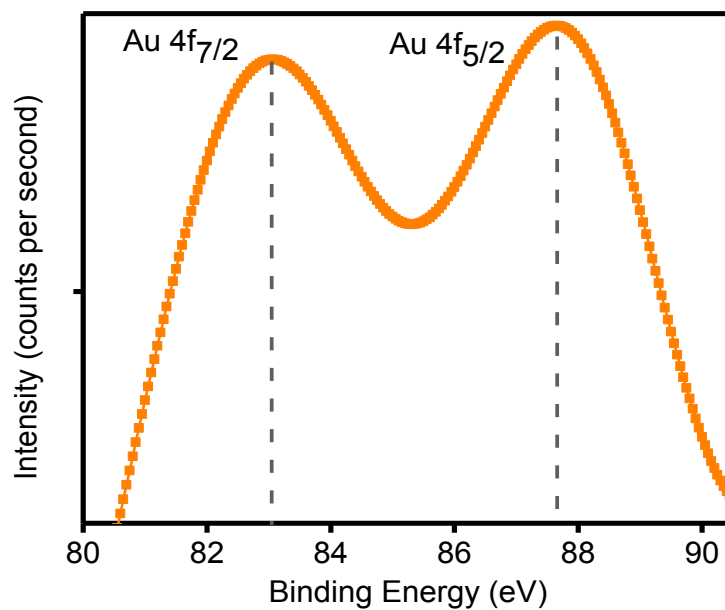


Figure 5: XPS spectra of Au 4f region for Au-TiO₂ nanocomposite.

Fig. S6

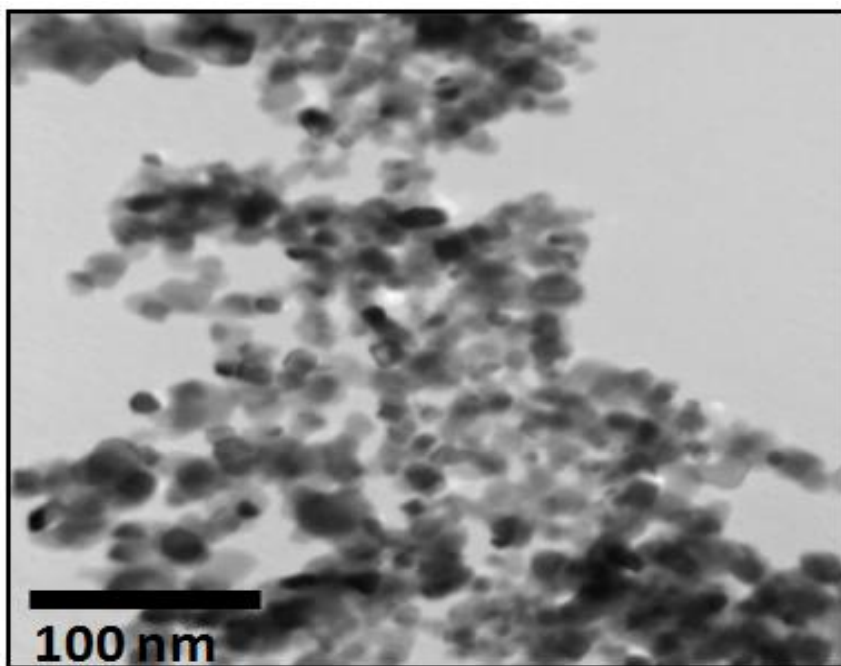


Figure 6: TEM image of Au-TiO₂ nanocomposite after recycling.

Table S1.**Table 1.** Elemental composition and physical parameters of M-TiO₂ composites.

Catalyst	Atomic % (XPS data)				S _{BET} (m ² g ⁻¹)	Metal reduction potential (eV)
	C1s	O1s	Ti2p	Respective metal (%)		
TiO ₂	--	--	--	--	50	--
Au-TiO ₂	35.71	50.13	14.11	Au4f (0.06)	29	1.5
Ag-TiO ₂	35.47	51.04	13.14	Ag3d (0.35)	33	0.80
Cu-TiO ₂	39.78	50.98	8.89	Cu2p (0.35)	20	0.34

Table S2.**Table 2.** Measurement of voltage (V), current (I), resistance (R), and conductance (S), corresponding to segments I and II of I–V characteristics.

Catalyst	Region	Voltage (V)	Current (nA)	Resistance (MΩ)	Conductance (S) × 10 ⁻⁷
TiO ₂	I	-2.0	330	6.060	1.65
	II	2.0	500	5.555	1.8
Ag-TiO ₂	I	-2.0	540	3.703	2.7
	II	2.0	600	3.333	3.0
Au-TiO ₂	I	-2.0	450	4.444	2.25
	II	2.0	500	4.000	2.5
Cu-TiO ₂	I	-2.0	420	4.761	2.1
	II	2.0	360	4.000	2.5