

Supporting information

Table S1. Effect of calcination temperature on ZnO crystallite size estimated from XRD

Catalyst	$d_{(\text{ZnO},100)}$, nm $2\theta = 31.8^\circ$
AU_350	4.4
AU_400	7.8
AU_450	10.0
ZM_350	n.d.
ZM_400	n.d.
ZM_450	10.1
MIX_350	5.5
MIX_400	7.5
MIX_450	10.1

Table S2. Effect of reduction temperature on Cu crystallite size ($2\theta = 43.3^\circ$) determined by *in situ* XRD

Catalyst	$d_{(\text{Cu})}$, nm $T_{\text{red}} = 200^\circ\text{C}$	$d_{(\text{Cu})}$, nm $T_{\text{red}} = 400^\circ\text{C}$	$d_{(\text{Cu})}$, nm $T_{\text{red}} = 600^\circ\text{C}$
AU_350	4	7	56
ZM_350	10	35	65
MIX_350	8	37	56

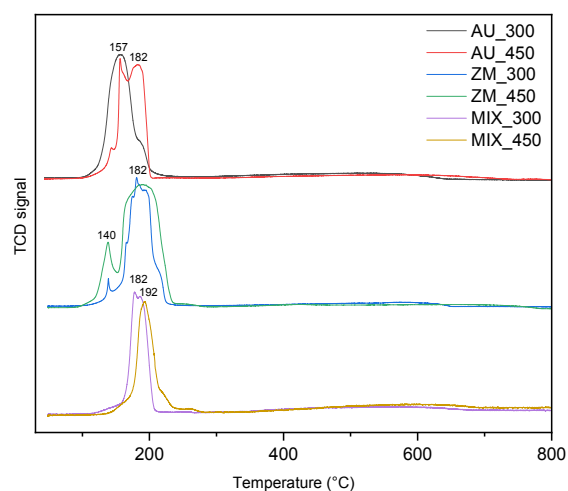


Figure S1. TPR-H₂ profiles of catalysts

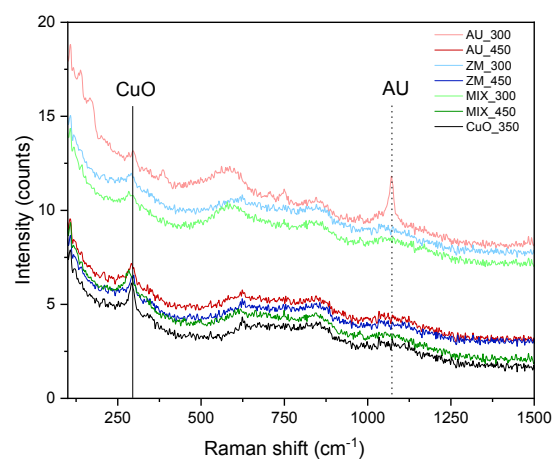


Figure S2. Raman spectra of calcined catalysts

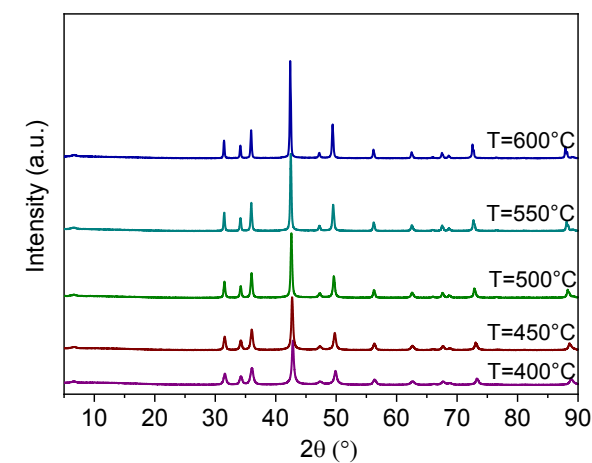
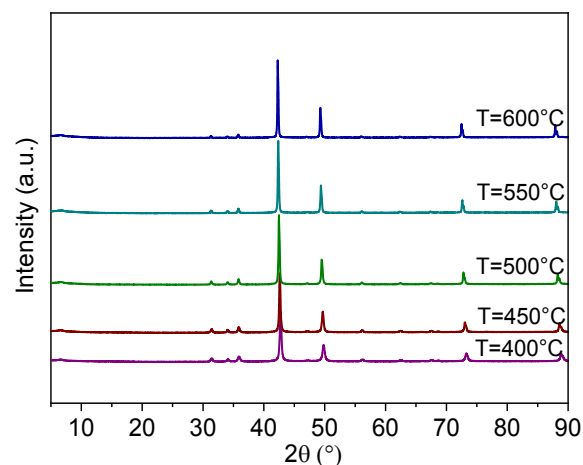
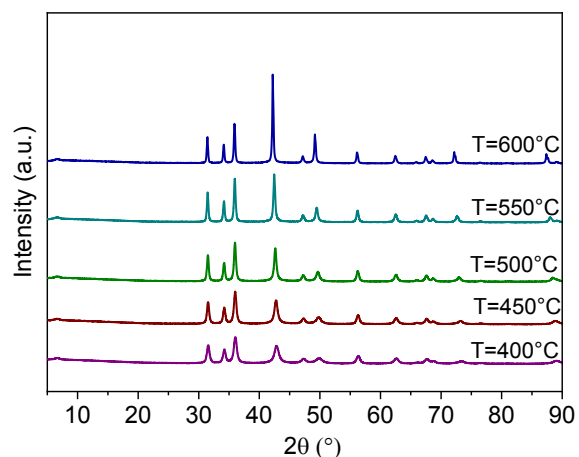


Figure S3. *In situ* XRD patterns during the catalyst reduction from 400 to 600 °C (top to bottom AU_350, ZM_350, MIX_350)

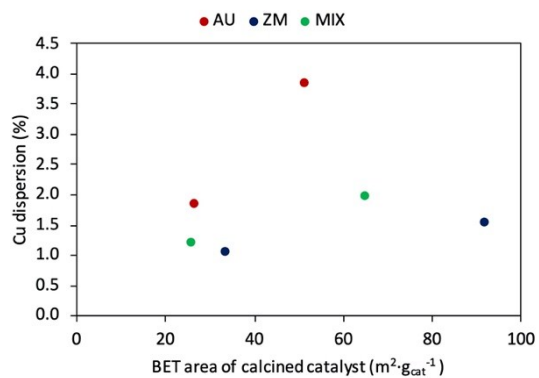


Figure S4. Correlation between Cu dispersion and BET area of calcined catalyst

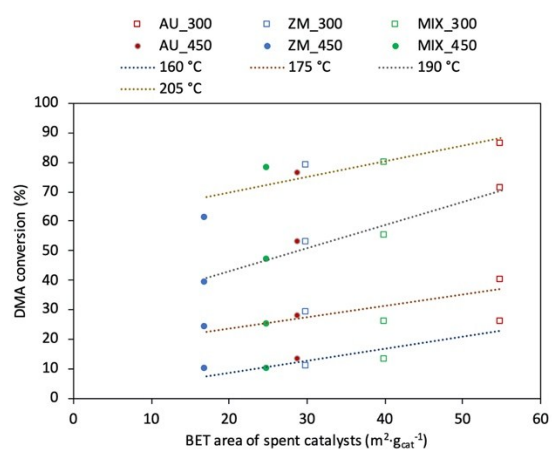


Figure S5. The correlation between the DMA conversion and BET area of spent catalysts