

1 Supplementary materials for:

2 **Cu/Mg/Al/Zr Non-Noble Metal Catalysts for O-Phenylphenol Synthesis**

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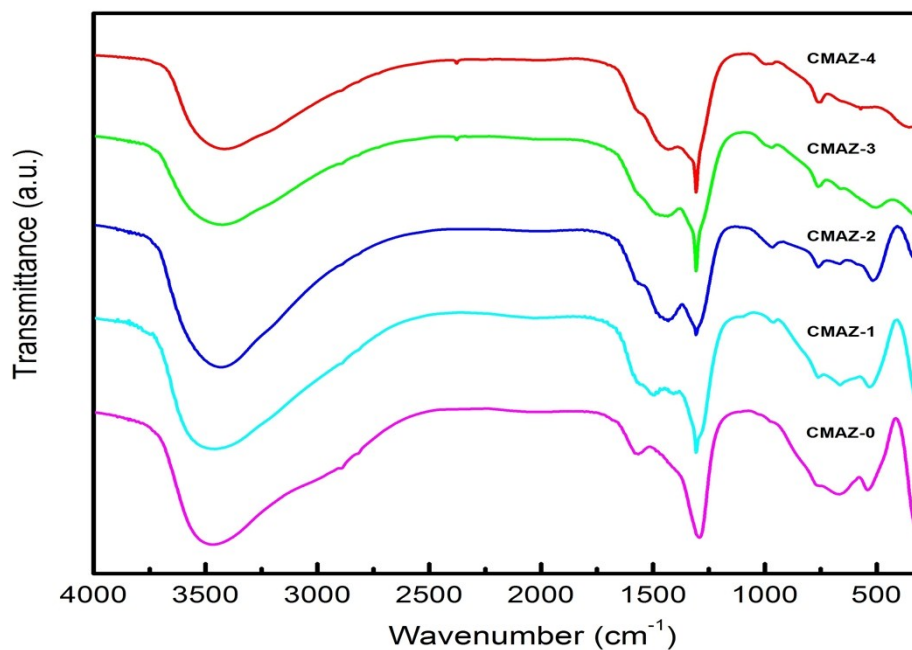
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11 **FT-IR for samples before calcination:**



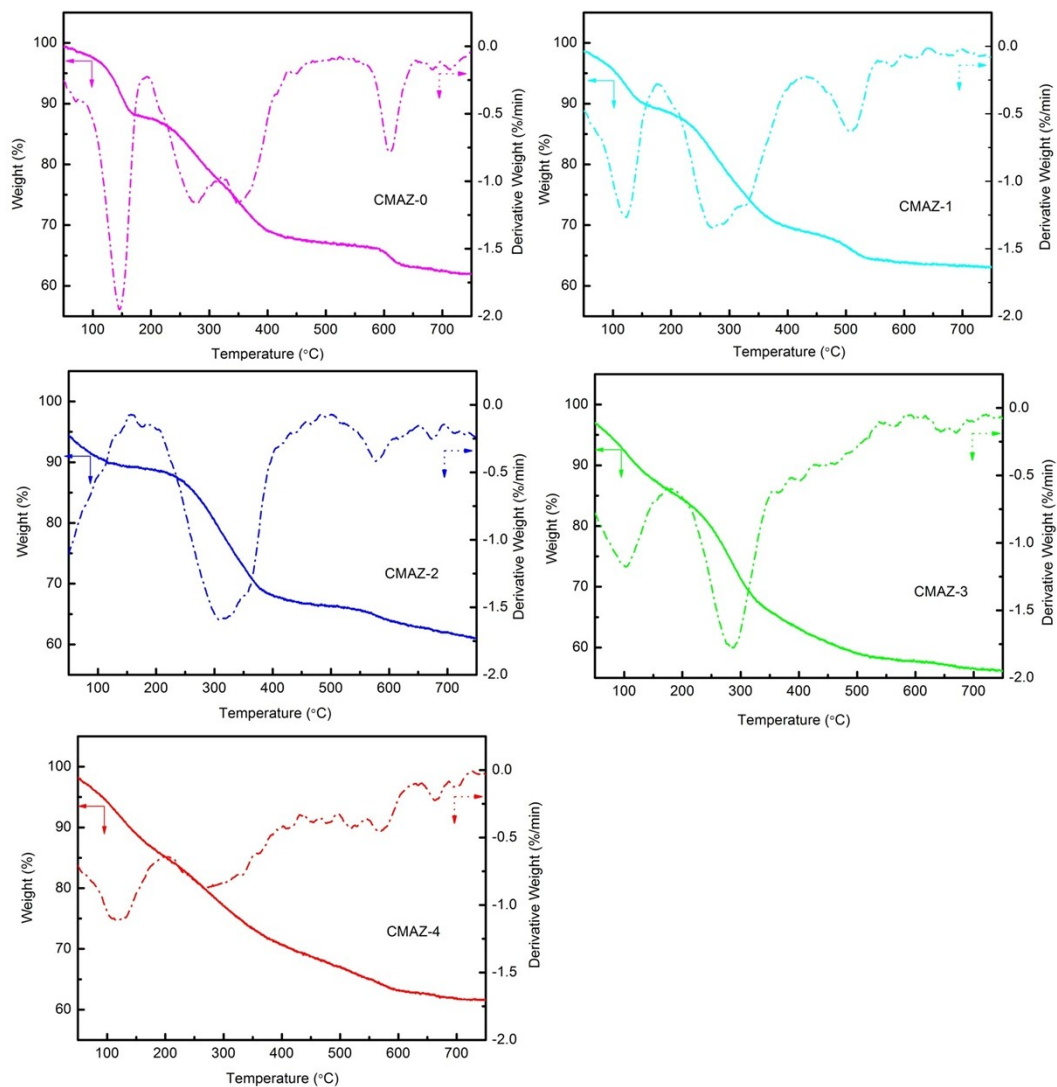
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13 **Fig.S1** FT-IR profile of Cu/Mg/Al/Zr catalysts before calcination.

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1 TG-DTG for precursors:



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Fig. S2 TG-DTG of the precursors in N₂.

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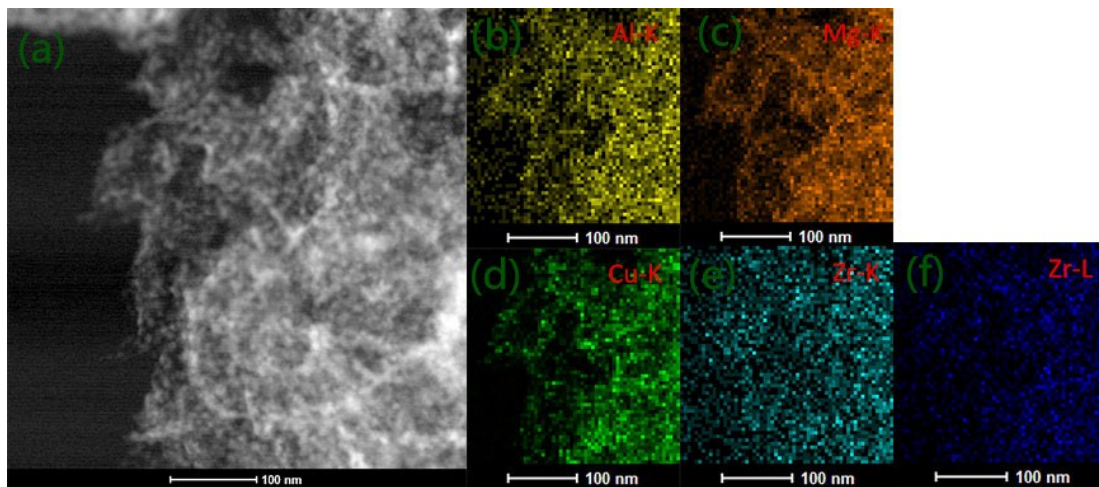
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1 HRTEM and elemental mapping images:



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4 **Fig. S3** HRTEM and elemental mapping images of catalysts after reduction (a)

5 Cu/Mg/Al/Zr catalysts (b) Al-K map (c) Mg-K map (d) Cu-K map (e) Zr-K map (f) Zr-L

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map

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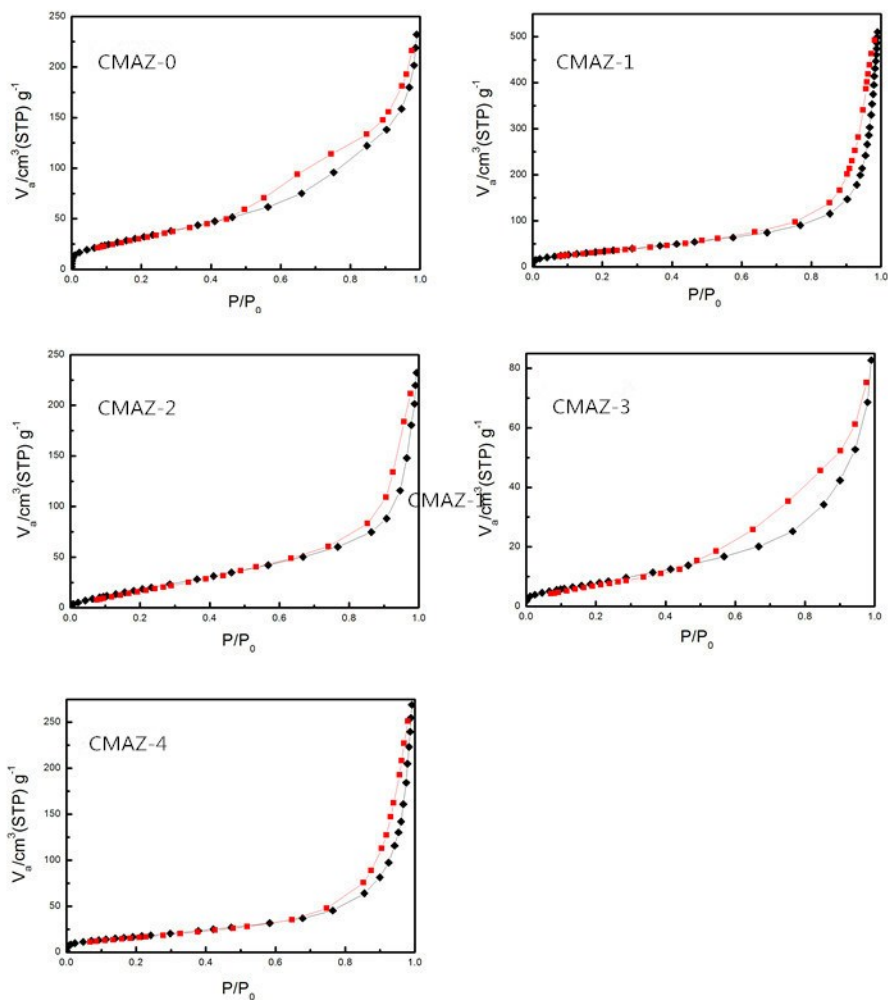
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1 **N₂ adsorption-desorption isotherms:**



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3 **Fig S4** N₂ adsorption-desorption isotherms of the CHT0.4, CHT0.8, CHT 1.5, CHT 1.8,

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CHT 2.0 and CHT 2.5 samples.

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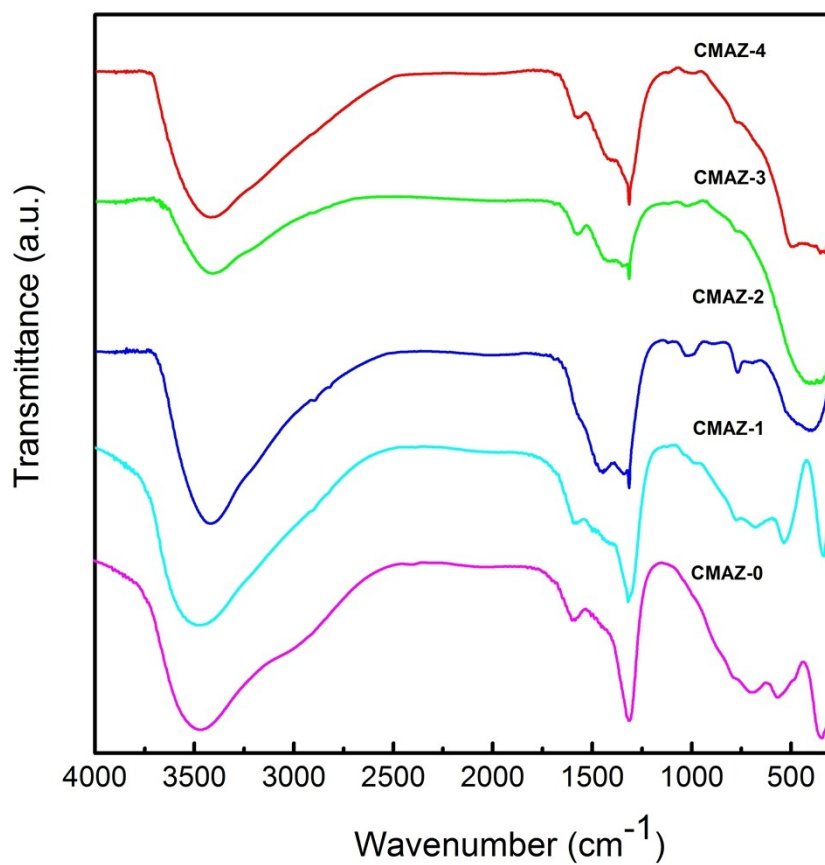
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1 FT-IR for samples after calcined:



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Fig. S5 FT-IR profile of Cu/Mg/Al/Zr catalysts after calcined.

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1 **Table 1S** The conversions for different Zr content catalysts at 330 °C.

	1h	2h	3h	4h	5h	6h	7h
CMAZ-0	98.55	99.71	99.54	99.25	98.75	98.70	97.61
CMAZ-1	99.49	99.70	99.36	99.31	99.01	98.63	98.21
CMAZ-2	97.33	96.04	95.23	94.30	93.33	91.25	88.88
CMAZ-3	95.65	96.32	95.97	95.78	94.17	90.23	88.79
CMAZ-4	84.89	67.45	48.13	37.74	27.35	27.53	26.90

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