Electronic Supplementary Material (ESI) for Catalysis Science & Technology.

Catalytic cracking of CH_3Cl on copper-based phases

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Table S1: Hypothetical reactions of CuCl formation from Cu.

Reaction	$\Delta_r G°$(400 °C) (kJ/mol)
$CH_3Cl + Cu \rightarrow CuCl + ¼\ C + ¾\ CH_4$	-78.9
$2\ CH_3Cl + Cu \rightarrow CuCl + 2\ C + HCl + {}^{5}/_{2}\ H_2$	-259.0
$CH_3Cl + Cu \rightarrow CuCl + ½\ C + ½\ CH_4 + ½\ H_2$	-81.8

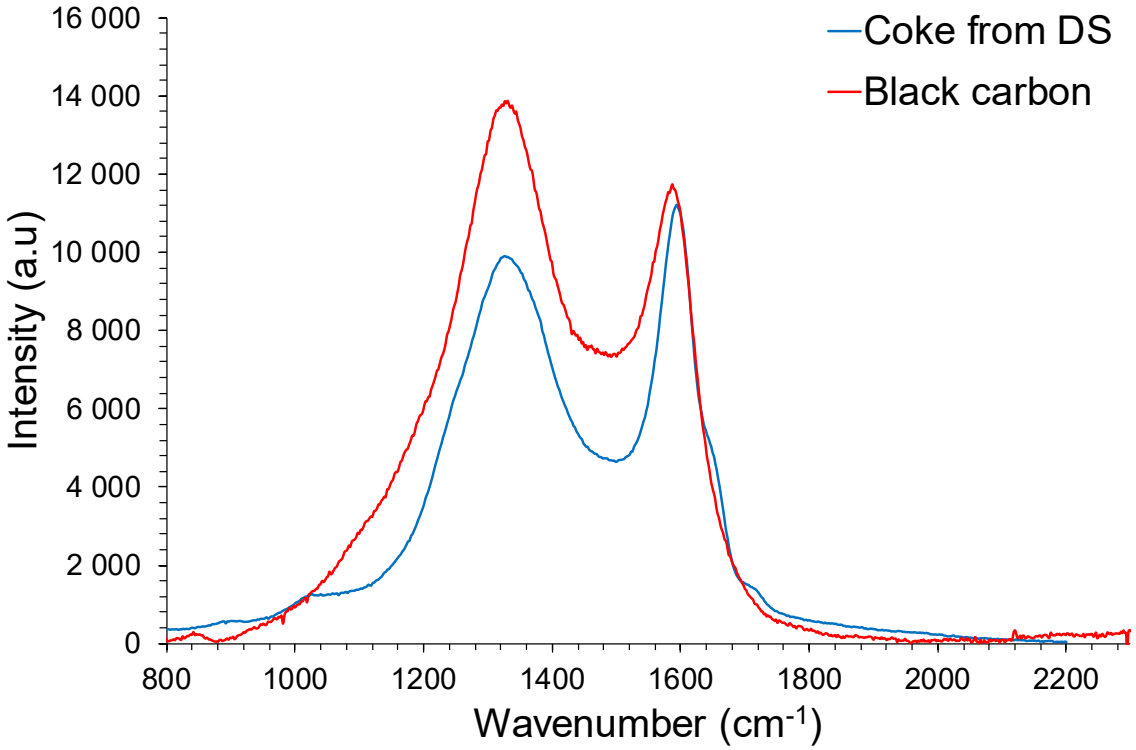

Figure S1 Raman spectra of coke formed during the direct synthesis and the carbon black support-Vulcan 3. The D and G bands located around 1350 and 1575 cm^{-1}, respectively are typical of disordered graphite.

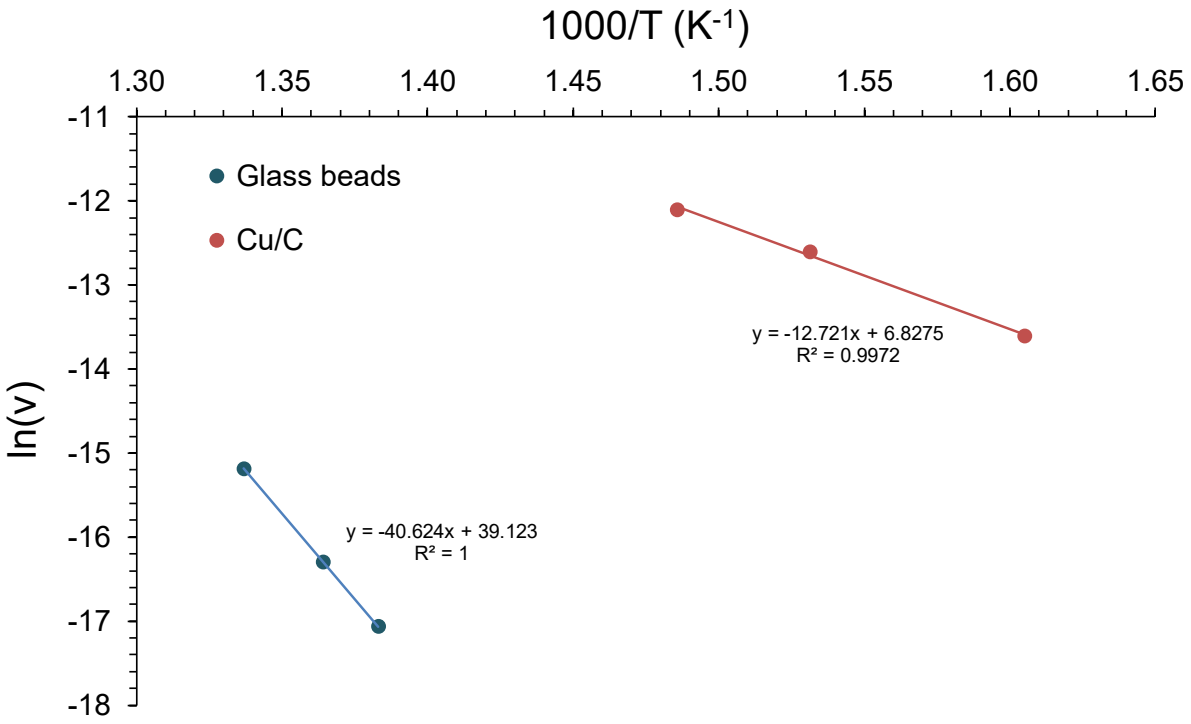

Figure S2 Plot of ln(v) as function of 1/T for CH_3Cl cracking on inert surface (glass beads) and Cu/C.

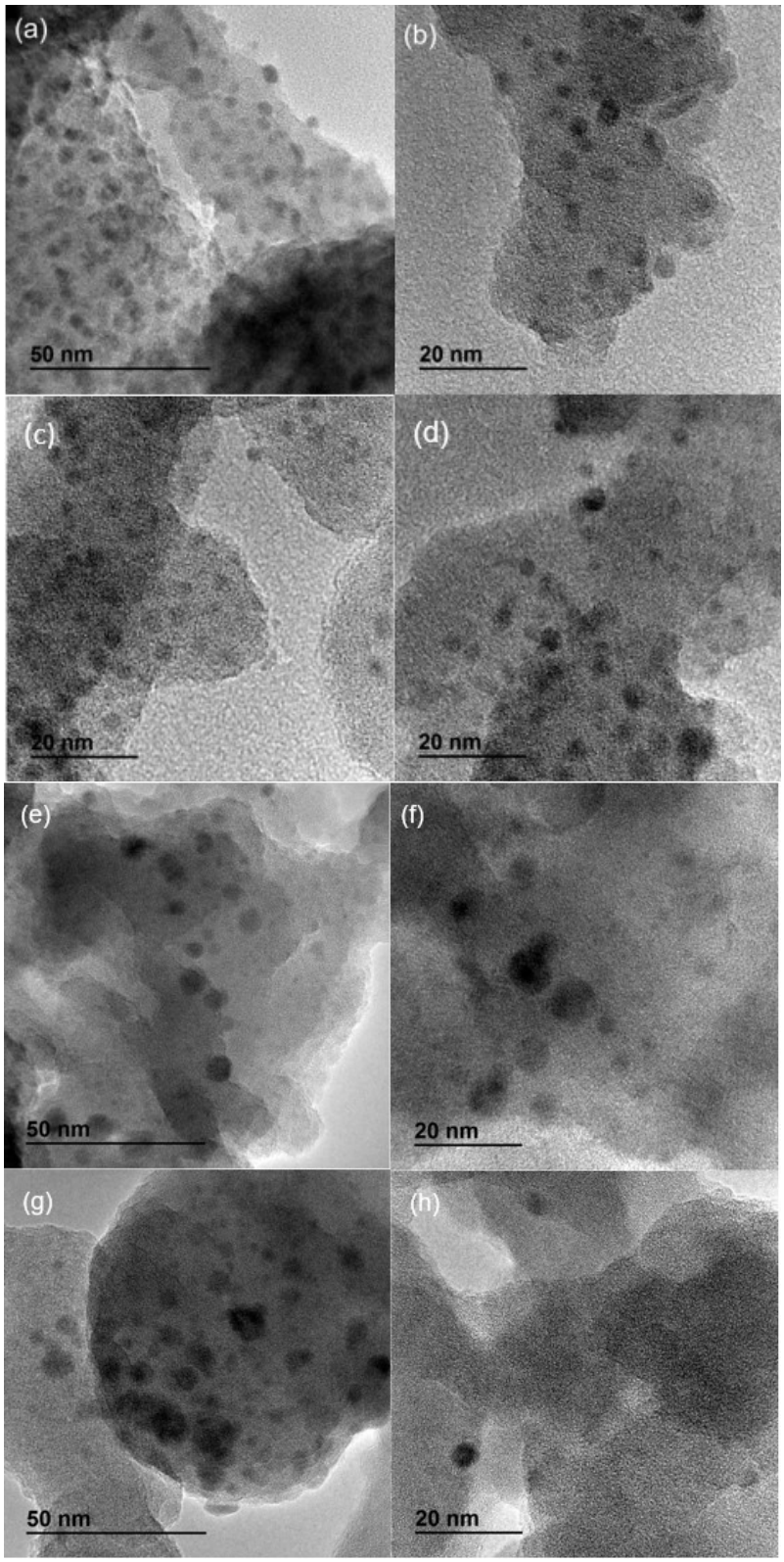

Figure S3: TEM images of Cu-nano/SiO_2 (a,b,c,d) before and (e,f,g,h) after the CH_3Cl cracking.