

Supplementary Materials

High-loaded nickel based sol-gel catalysts for methylcyclohexane dehydrogenation

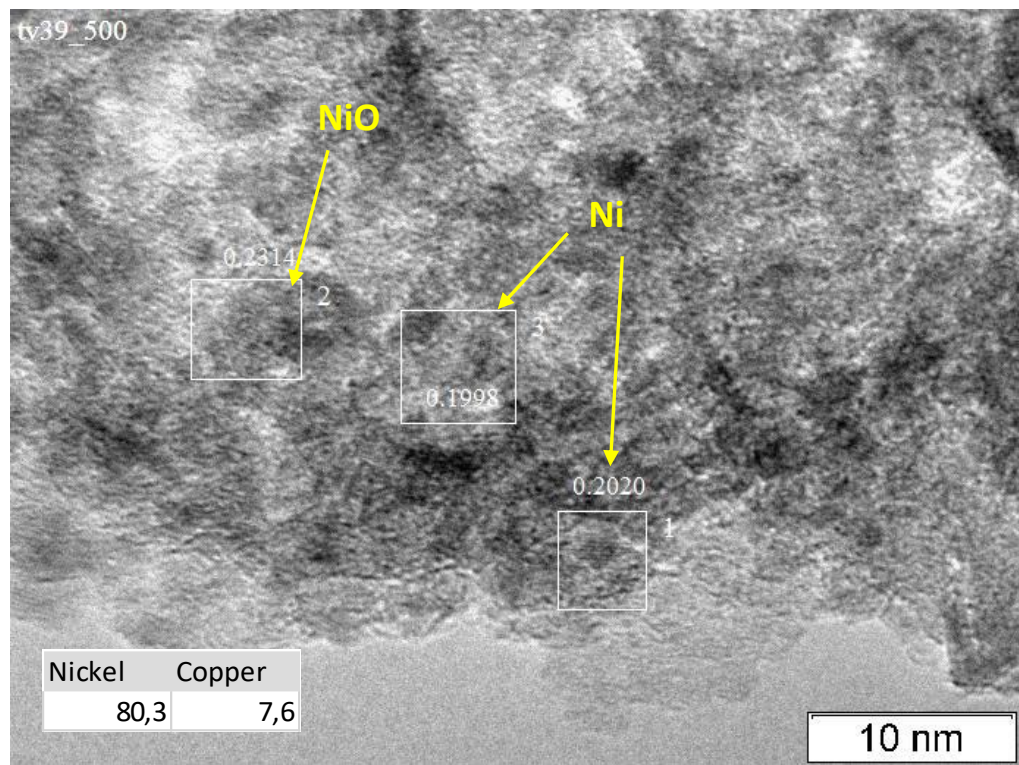
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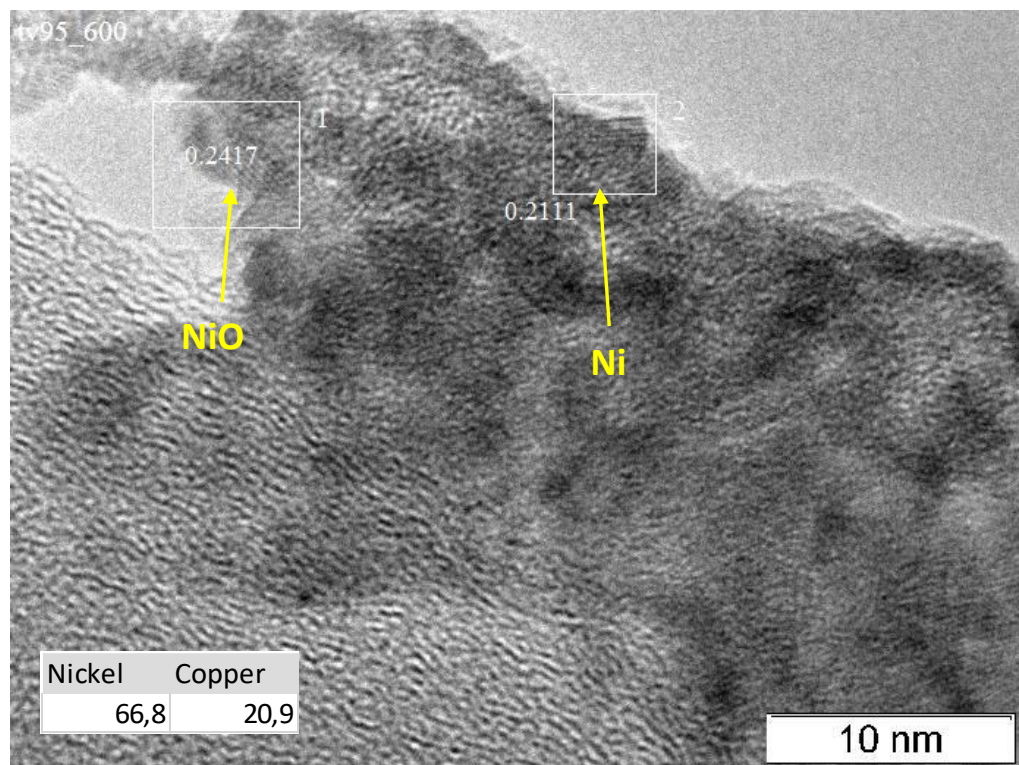
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HRTEM data

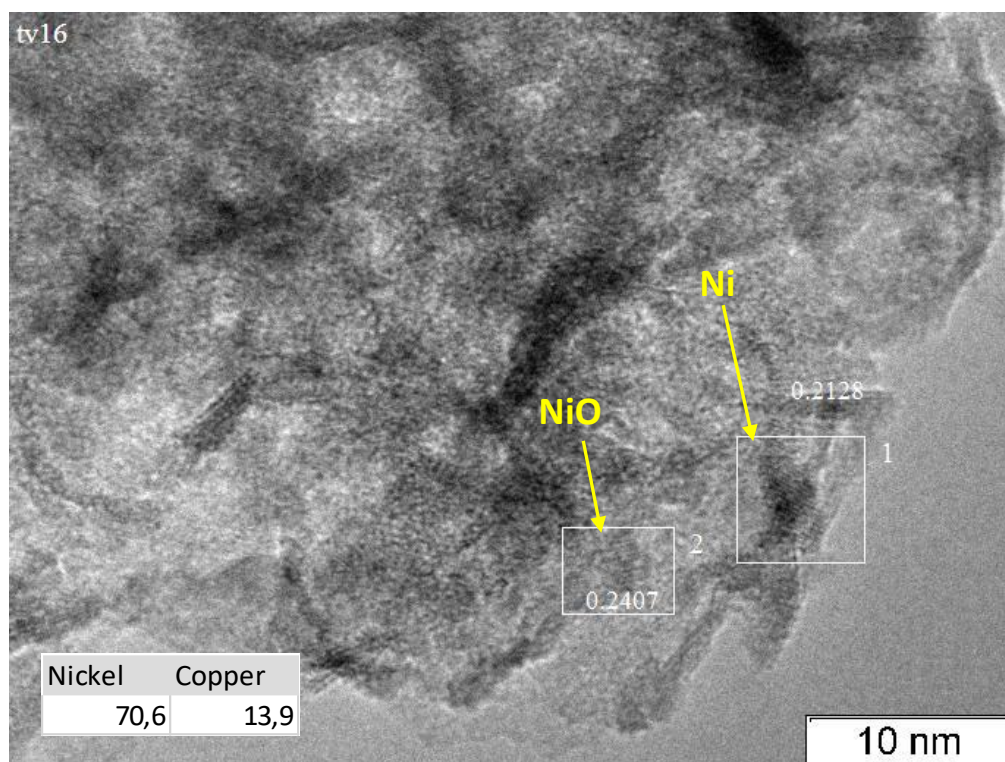
SG_Ni95Cu5-SiO₂



SG_Ni80Cu20-SiO₂



pCu_Ni95Cu5-SiO₂



pCu_Ni80Cu20-SiO₂

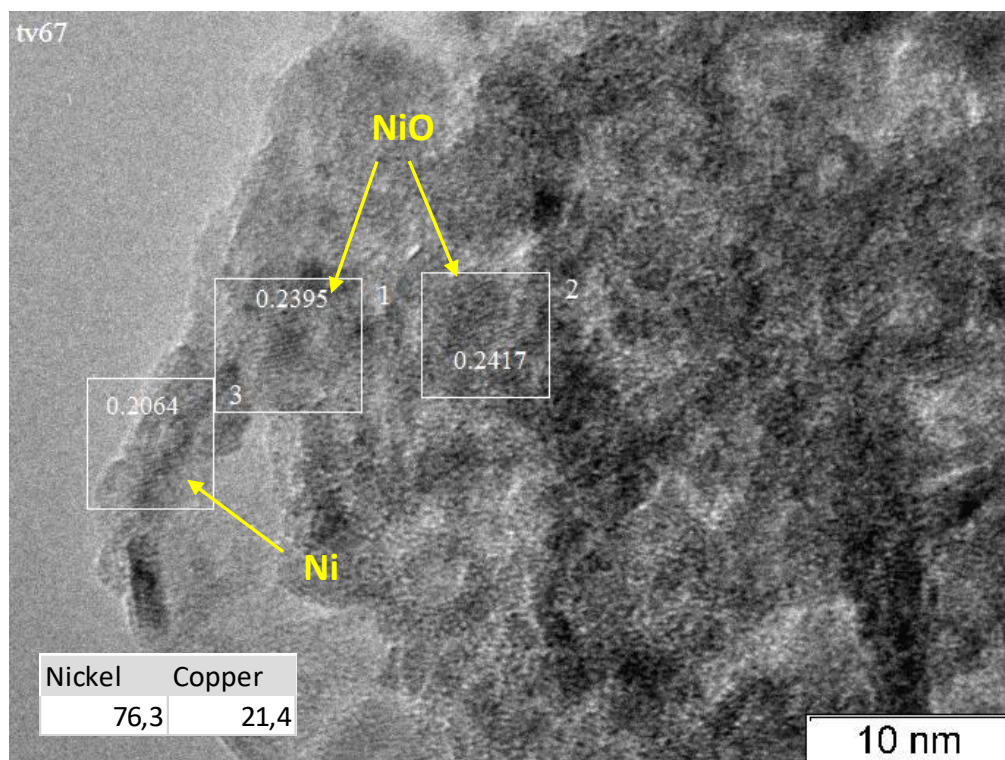


Figure S1. HRTEM images and corresponding EDX data (nickel and copper atomic percentages) for the catalysts after reduction at 400 °C and passivation.

X-ray diffraction

Table S1. Phase composition and average size of coherent scattering region (CSD size, Å) for the catalysts in oxidized state

Sample	Phase composition	CSD size (Å)
SG_Ni-SiO ₂	NiO	30
SG_Ni95Cu5-SiO ₂	NiO	30
	CuO	360
SG_Ni90Cu10-SiO ₂	NiO	30
	CuO	170
SG_Ni80Cu20-SiO ₂	NiO	30
	CuO	260
pCu_Ni95Cu5-SiO ₂	NiO	37
	CuO	-
pCu_Ni90Cu10-SiO ₂	NiO	40
	CuO	360
pCu_Ni80Cu20-SiO ₂	NiO	35
	CuO	580
pCu_Ni70Cu30-SiO ₂	NiO	250 and 25 (bimodal)
	CuO	550

Activity testing

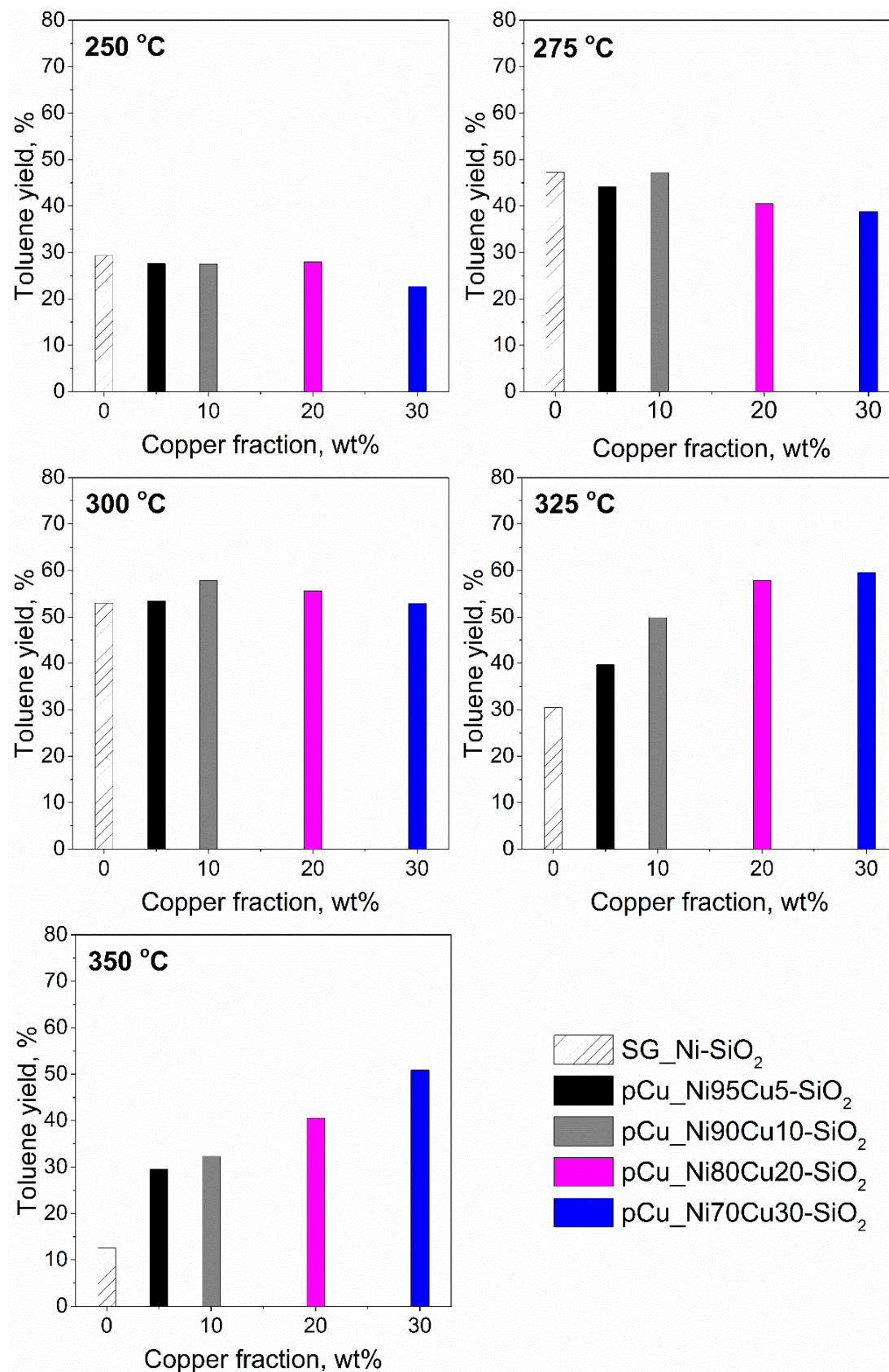


Figure S2. Dependence of toluene yield on copper fraction (wt%) in the pCu catalysts and SG_Ni-SiO₂ at different temperatures in the methylcyclohexane dehydrogenation. Copper fraction is a percentage of copper relative to the total amount of both metals (nickel and copper).