

Tuning NiCu/AlOOH Catalysts for Optimal Glycerol Hydrogenolysis to 1,2-Propanediol

Asma Ghorbani and Ajay K. Dalai*

Catalysis and Chemical Reaction Engineering Laboratories

Department of Chemical and Biological Engineering, College of Engineering, University of Saskatchewan,
Saskatoon, SK Canada S7N 5A9

*Corresponding author: ajay.dalai@usask.ca

Catalysts	Integrated Peak Area		
	Lewis Acid Sites	Brønsted Acid Sites	Lewis/Brønsted
AlOOH	468.6	250.5	1.9
10Cu/AlOOH	638.6	167.9	3.8
5Ni-10Cu/AlOOH	650.8	156.7	4.2
10Ni-10Cu/AlOOH	654.2	168.9	3.9
15Ni-10Cu/AlOOH	666.1	172.1	3.9
25Ni-10Cu/AlOOH	882.5	234.1	3.8
30Ni-10Cu/AlOOH	881.7	234.4	3.8
25Ni/AlOOH	586.6	245.4	2.4
25Ni-2Cu/AlOOH	498.2	194.5	2.6
25Ni-5Cu/AlOOH	399.0	209.1	1.9
25Ni-15Cu/AlOOH	884.9	229.9	3.8

Table S1. The distribution of Lewis and Brønsted acid sites on the prepared catalysts.

Catalysts	Binding Energy (eV)					
	Ni 2p _{3/2}			Cu 2p _{3/2}		
	Ni ⁰	Ni ²⁺	Ni ⁰ / (Ni ⁰ + Ni ²⁺)	Cu ⁰ /or Cu ⁺	Cu ²⁺	Cu ⁰ / (Cu ⁰ + Cu ²⁺)
10Cu/AlO(OH)	n.d.	n.d.		932.26	933.40	0.59
5Ni-10Cu/AlO(OH)	853.55	856.28	0.12	932.96	934.72	0.47
10Ni-10Cu/AlO(OH)	853.90	856.08	0.17	932.71	934.56	0.42
15Ni-10Cu/AlO(OH)	853.25	855.77	0.12	932.60	934.25	0.42
25Ni-10Cu/AlO(OH)	853.79	856.16	0.16	932.94	934.67	0.49
30Ni-10Cu/AlO(OH)	853.35	855.88	0.12	932.77	934.55	0.45
25Ni/AlO(OH)	853.18	855.66	0.17	n.d.	n.d.	n.d.
25Ni-2Cu/AlO(OH)	853.43	855.79	0.16	932.41	933.77	0.42
25Ni-5Cu/AlO(OH)	853.46	855.82	0.16	932.42	933.78	0.42
25Ni-15Cu/AlO(OH)	853.33	855.90	0.17	932.85	934.61	0.51

Table S2. Summary of XPS binding energies for Ni 2p_{3/2} and Cu 2p_{3/2}.

n.d.: Not defined

