

Au-based bimetallic catalysts for aerobic oxidation of 5-hydroxymethylfurfural to 2,5-furandicarboxylic acid under base-free reaction conditions

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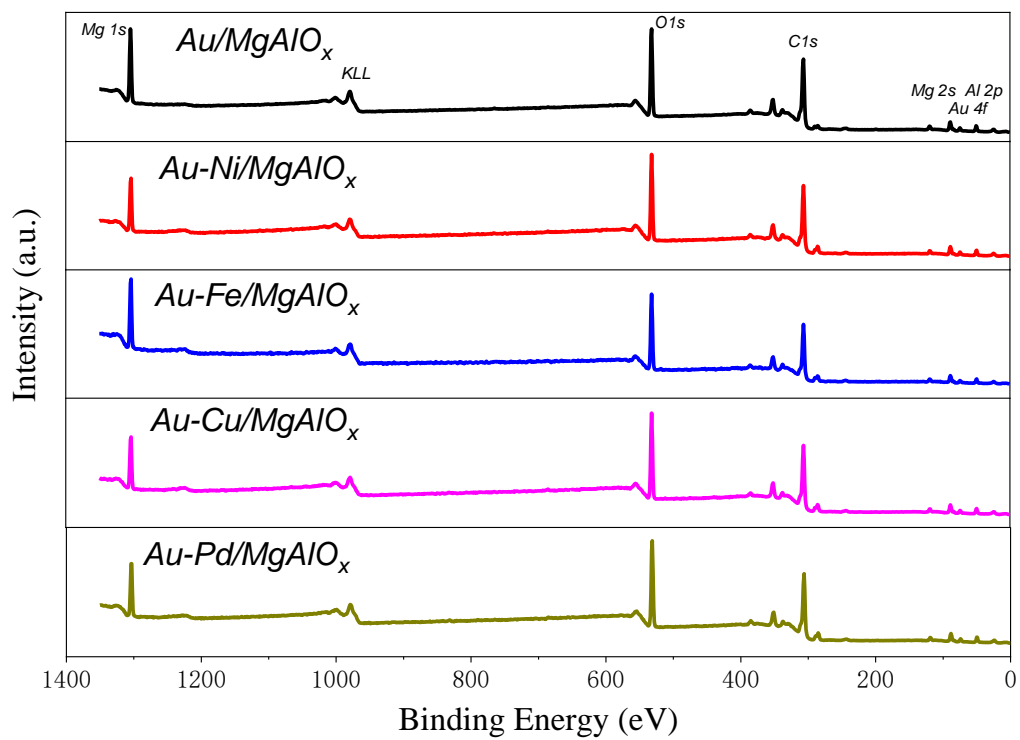


Figure S1. The XPS survey of different Au-M bimetallic catalysts.

Table S1. The surface atomic ratios of different elements in the supported Au and Au-M bimetallic catalysts derived from XPS spectra.

Atom%	Au/MgAlO _x	Au-Ni/MgAlO _x	Au-Fe/MgAlO _x	Au-Cu/MgAlO _x	Au-Pd/MgAlO _x
Mg 1s	19.19	21.0	23.65	19.39	18.88
Al 2p	9.3	7.31	7.58	8.28	7.88
S 2P	0.25	0.23	0.36	0.23	0.27
C 1s	9.61	16.04	15.49	16.03	17.01
O 1s	60.84	54.52	51.94	55.27	54.71
Au 4f	0.82	0.72	0.68	0.70	0.71
M	-	0.18	0.30	0.10	0.53

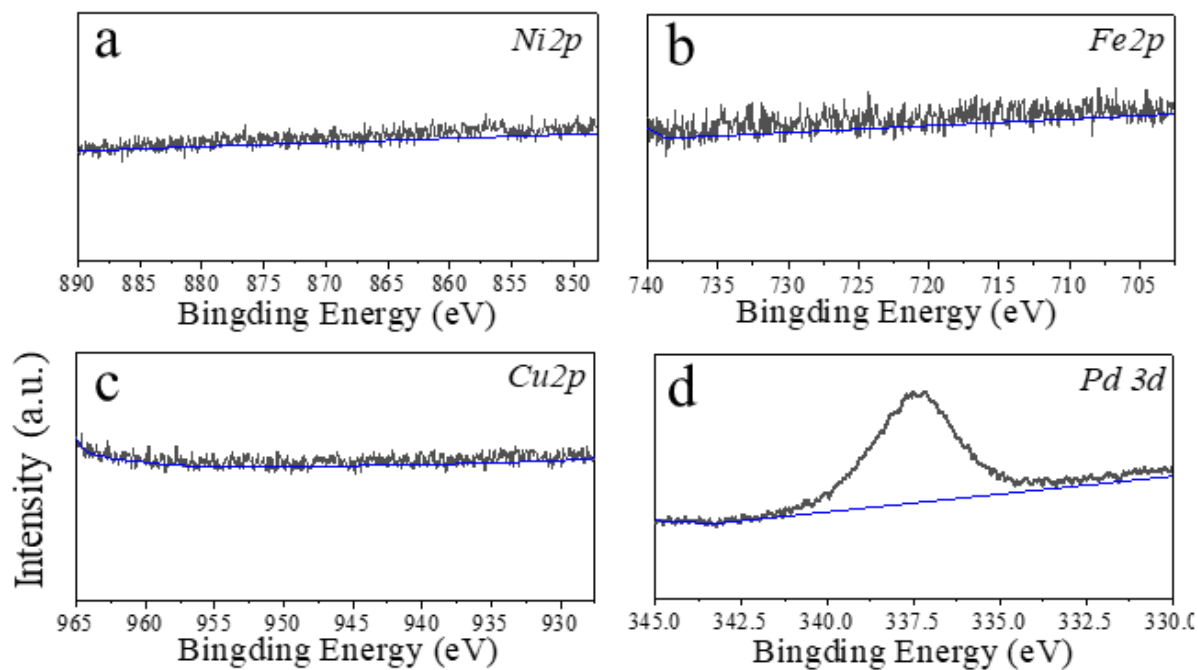


Figure S2. (a) Ni 2p; (b) Fe 2p; (c) Cu 2p and (d) Pd 3d XPS spectra of different Au-based bimetallic catalysts.

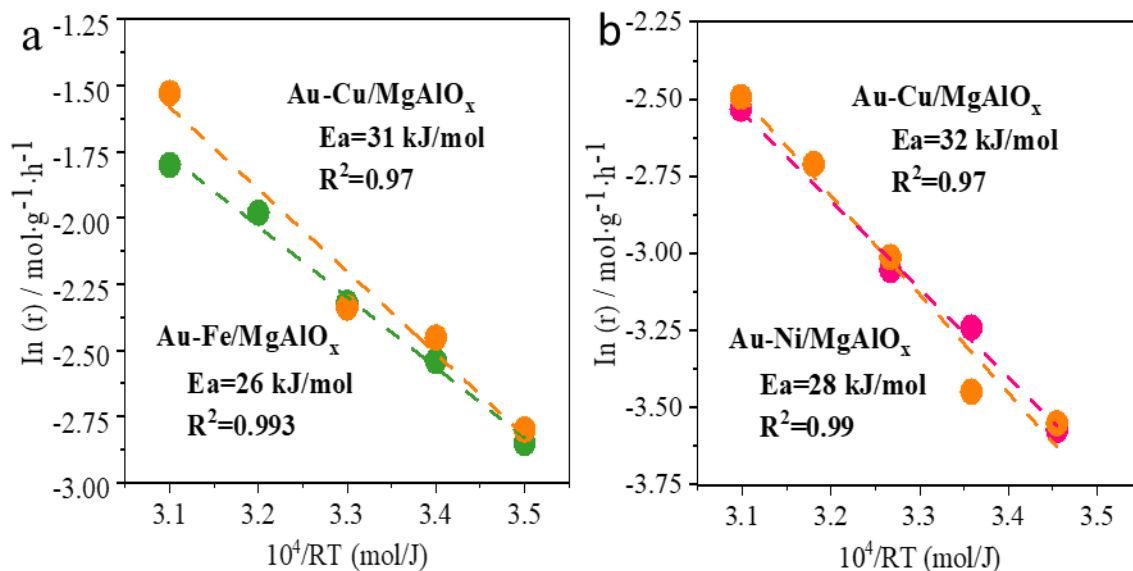


Figure S3. (a) Arrhenius plots for HMF oxidation over the Au-Fe/MgAlO_x and Au-Cu/MgAlO_x catalysts, Reaction conditions: catalyst: 15 mg, C_{HMF}: 20 mM, water: 5 mL, pressure of O₂: 5 atm, reaction time: 1 min, reaction rates (r) were calculated by converted substrates per gram of catalyst per hours, the conversions were all below 20%; (b) Arrhenius plots for HFCA oxidation over the Au-Ni/MgAlO_x and Au-Cu/MgAlO_x catalysts. Reaction conditions: catalyst: 15 mg, C_{HFCA}: 20 mM, water: 5 mL, pressure of O₂: 5 atm, reaction time: 2 min, r were calculated by converted substrates per gram of catalyst per hours, the conversions were all below 20%.