

Electronic Supporting Information

Synthesis of sub-nanometer gold particles on modified silica

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Nitrogen Physisorption

Table S1. Parameters derived from nitrogen physisorption for all SBA-15 supported materials.

Entry	Sample ^[a]	S _{BET} (m ² /g)	V _{tot} (cm ³ /g)
1	Au/N-SBA-15_K(9.5)	385	0.59
2	Au/N-SBA-15_K(11)	458	0.75
3	Au/N-SBA-15_A(11)	314	0.39
4	Au/N-SBA-15	238	0.35
5	Au/SBA-15_K(9.5)	454	0.57
6	Au/SBA-15_K(11)	495	0.87
7	Au/SBA-15_A(11)	433	0.73
8	Au/SBA-15	470	0.63
9	N-SBA-15	297	0.43
10	SBA-15	533	0.68

^[a] Sample legend: K = potassium carbonate, A = ammonia, pH values in parentheses.

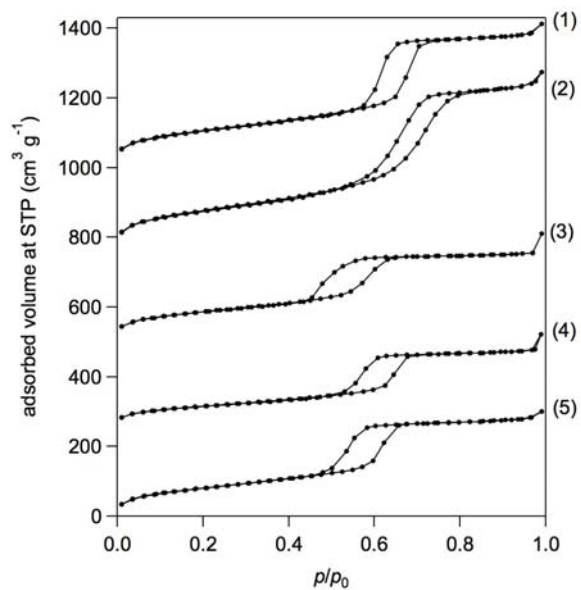


Figure S1. Nitrogen adsorption-desorption isotherms of (1) Au/N-SBA-15_K(9.5), (2) Au/N-SBA-15_K(11), (3) Au/N-SBA-15_A(11), (4) Au/N-SBA-15, and (5) N-SBA-15. Isotherms (1)-(4) have been shifted upwards by 250 units consecutively.

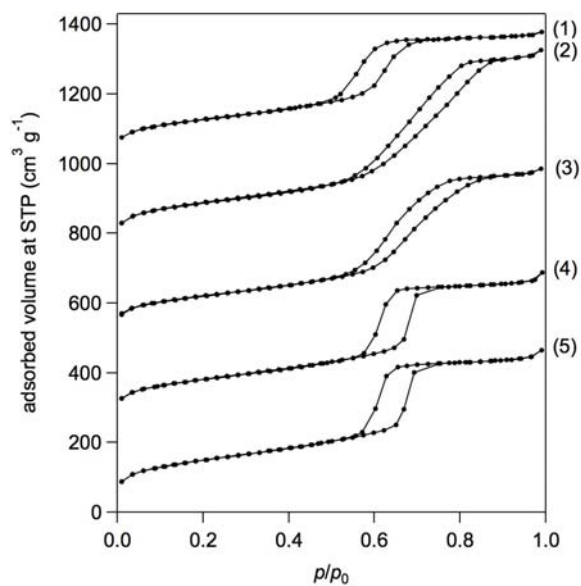


Figure S2. Nitrogen adsorption-desorption isotherms of (1) Au/SBA-15_K(9.5), (2) Au/SBA-15_K(11), (3) Au/SBA-15_A(11), (4) Au/SBA-15, and (5) SBA-15. Isotherms (1)-(4) have been shifted upwards by 250 units consecutively.

Small-angle X-ray Diffraction Patterns

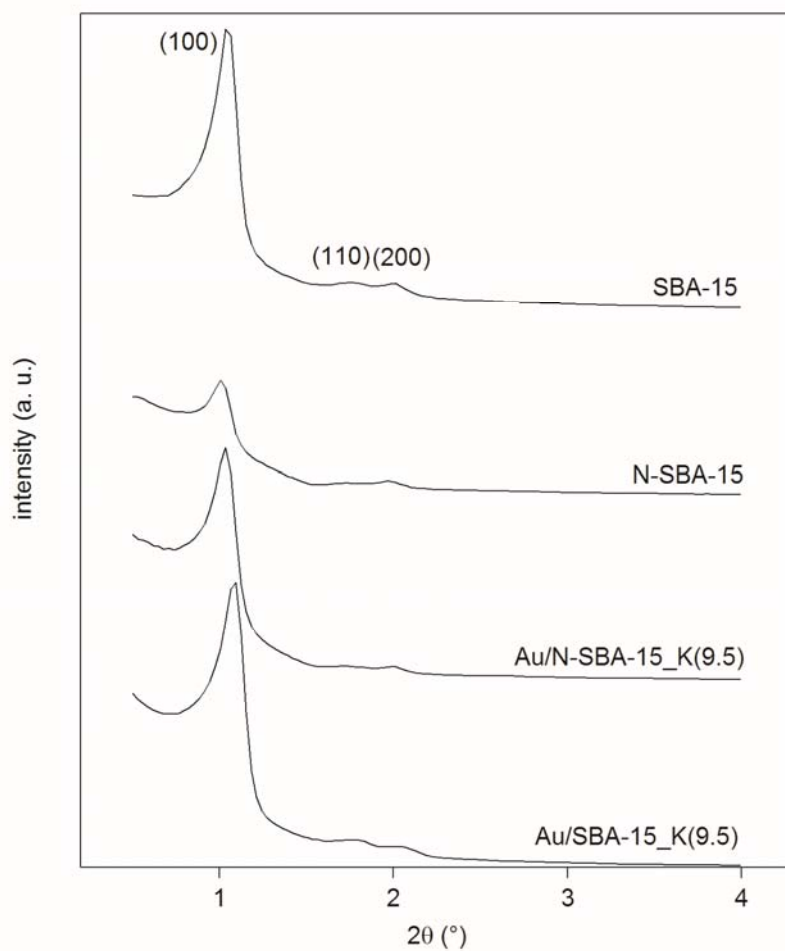


Figure S3. Small-angle XRD patterns of unmodified SBA-15, N-SBA-15, Au/SBA-15_K(9.5) and Au/SBA-15_K(9.5).

Catalytic Dehydrogenation of Formic Acid

Table S2. Temperature and carbon monoxide selectivity at 50% conversion for all catalysts.

Entry	Sample	Temperature at 50% conversion [°C]	Carbon monoxide selectivity at 50% conversion [%]
1	Au/N-SBA-15_K(9.5)	90	0
2	Au/N-SBA-15_K(11)	100	0
3	Au/N-SBA-15_A(11)	90	0
4	Au/N-SBA-15	125	0
5	Au/SBA-15_K(9.5)	210	21
6	Au/SBA-15_K(11)	260	16
7	Au/SBA-15_A(11)	100	0
8	Au/SBA-15	220	12

Particle Size after Catalysis

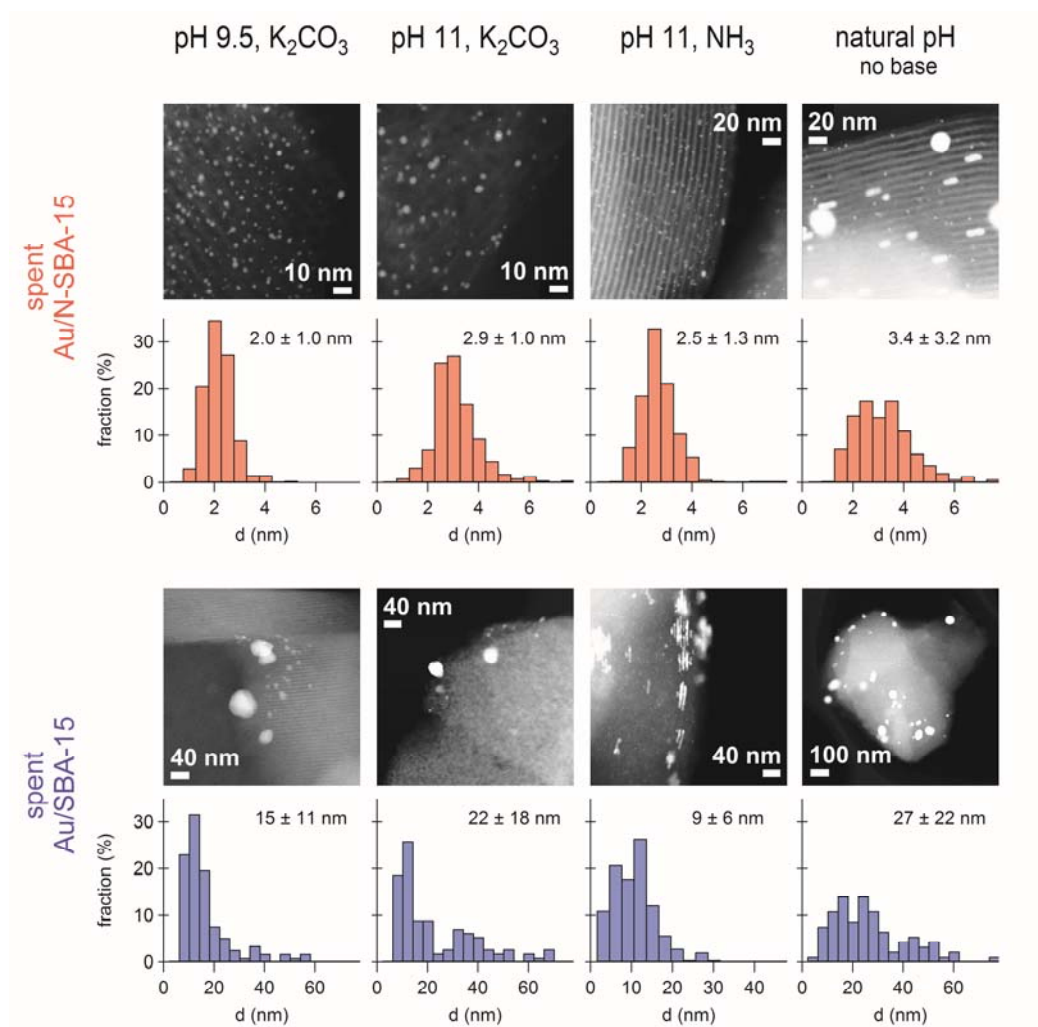


Figure S4. STEM images for gold catalysts on amine-functionalized N-SBA-15 (top) and SBA-15 (bottom) after catalysis. The corresponding particle size histograms and average particle size and standard deviation are included.