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Electronic supplementary Information

Mesoporous silica supported cobalt catalysts for gas phase hydrogenation of Nitrobenzene: Role of pore structure on stable catalytic performance

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Experimental Section

$$\text{Surface coverage (\%)} = \frac{\text{Active metal surface area (ASA) } (m^2/g)}{\text{Surface area } (S_{BET}) \ (m^2/g)} \text{X } 100$$

$$\text{Surface density (\%)} = \frac{\text{Number of surface Ni atoms}}{\text{Surface area } (S_{BET}) \ m^2/g} \text{X } 100$$

Results and discussion

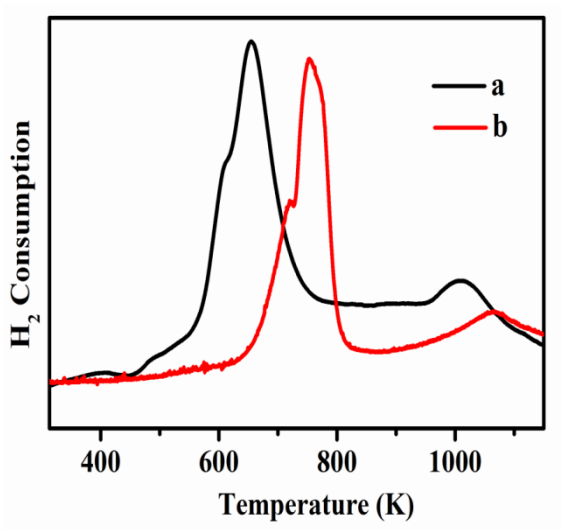

Fig. ESI 1 H_2-TPR profiles of (a) 20CC-12 and (b) 20CS-16 catalysts

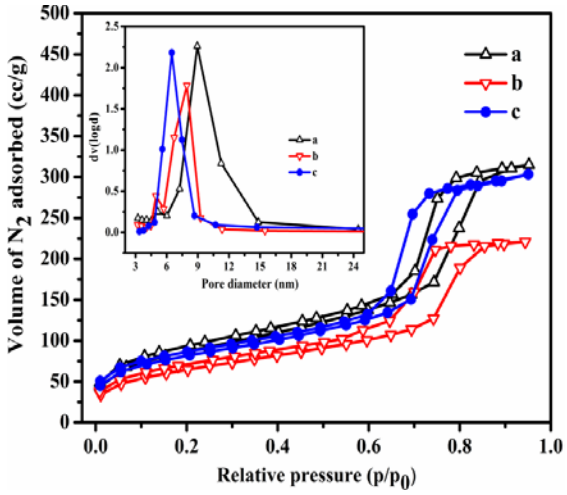

Fig.ESI 2: N_2-adsorption desorption isotherms and pore size distribution patterns of fresh and spent 5CC-12 catalysts, (a) 5CC-12 (fresh), (b) U5CC-12 (spent), (c) 5CC-12 (regenerated spent)

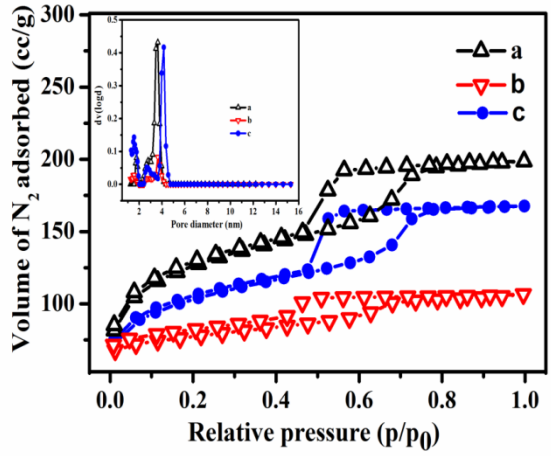

Fig. ESI 3: N_2-adsorption desorption isotherms and pore size distribution patterns of fresh and spent 5CS-16 catalysts, (a) 5CS-16 (fresh), (b) U5CS-16 (spent), (c) 5CS-16 (regenerated spent)

Table ESI 1: Textural properties of fresh, spent and regenerated spent 5CC-12 and 5CS-16 catalysts.

Catalyst	S_{BET}[a] (m^2g^{-1})	V_t [b] (cc/g)	D[c] (nm)
5CC-12	304	0.41	6.01
U5CC-12	233	0.34	5.85
U5CC-12(R)	289	0.46	6.48
5CS-16	402	0.28	4.86
U5CS-16	76	0.08	4.07
U5CS-16(R)	390	0.29	4.75

[a] BET Surface area, [b] Total Pore Volume at relative pressure (p/p_0), [c] Average Pore size, (C) Regenerated spent catalysts in air flow at 873 K for 5 h.

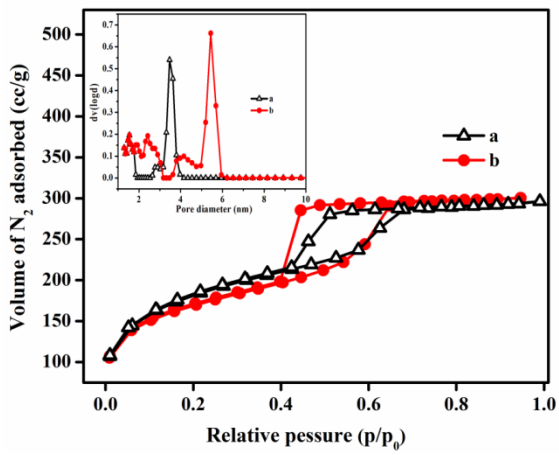

Fig.ESI 4: N_2-adsorption desorption isotherms and pore size distribution patterns of 5CS-16 catalysts with different pore size (a) 5CS-16 (1) (b) 5CS-16 (2)

Table ESI2: Textural properties of 5CS-16 catalysts with different pore size.

Catalyst	S_{BET}[a] (m^2g^{-1})	V_t [b] (cc/g)	D[c] (nm)
5CS-16 (1)	501	0.45	3.2
5CS-16 (2)	579	0.48	5.7
[a] BET Surface area, [b] Total Pore Volume at relative pressure (p/p_0), [c] Average Pore size			

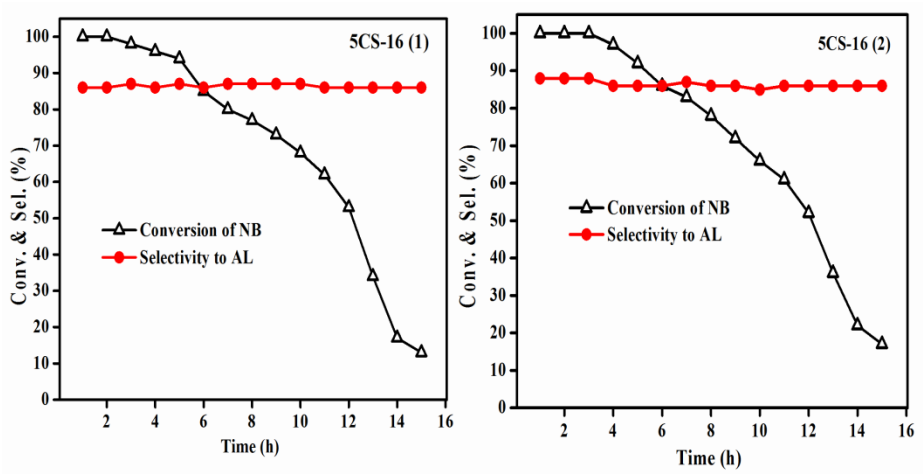

Fig.ESI 5: Time on stream study on 5CS-16 catalysts with different pore size

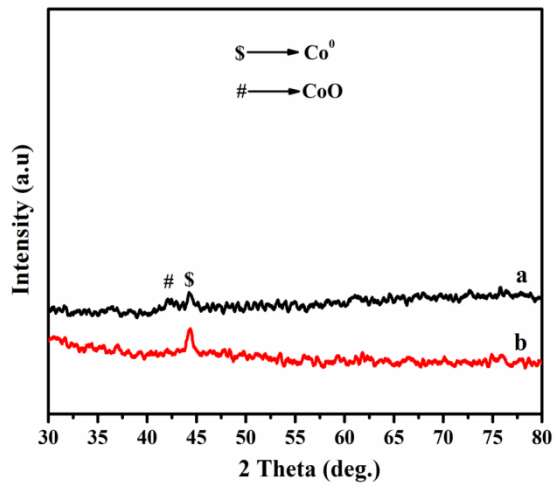

Fig.ESI 6: XRD patterns 5CS-16 catalysts at different reduction temperatures (a) 5CS-16 (773K) (b) 5CS-16 (873 K)