## **Electronic Supplementary Information (ESI)**

## Filter and Buffer-pot Confinement Effect of Hollow Sphere Catalyst for Promoted Activity and Enhanced Selectivity

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1. Fig. S1:

Additional SEM images of Al<sub>2</sub>O<sub>3</sub> hollow sphere intermediate formed in the two-pot process

2. Fig. S2:

Distribution of cobalt species on the hollow catalyst demonstrated by point-selected EDS results

3. Table S1:

Quantized acidic amount by NH<sub>3</sub>-TPD calculation



Fig. S1 SEM images of the Al<sub>2</sub>O<sub>3</sub> intermediates: (a) Al<sub>2</sub>O<sub>3</sub>/HS (G/M=1) and (b) Al<sub>2</sub>O<sub>3</sub>/HS<sup>2</sup> (G/M=2).



**Fig. S2** Distribution of cobalt species on the hollow catalyst: (a) SEM images of a cracked pellet on the CA/HS-2p hollow catalyst with marked EDS points; (b) Distribution of Co amount ranging from outer to inner surface basing on EDS results.

Catalyst	Acid amount $(\text{mmol} \cdot \text{g}^{-1})$		
	Weak	Middle	Total
Al <sub>2</sub> O <sub>3</sub> /SS	0.43	2.75	3.18
CA/SS	0.39	2.77	3.16
Al <sub>2</sub> O <sub>3</sub> /HS	0.41	8.91	9.32
CA/HS-2p	0.40	8.87	9.27
$Al_2O_3/HS^2$	0.38	8.64	9.02
CA/HS-2p <sup>2</sup>	0.36	8.63	8.99

Table S1 Acid distribution of the solid and hollow catalysts.