Electronic Supplementary Material (ESI) for RSC Advances.

Supplementary Information

Isophthalonitrile (IPN) Hydrogenation over K modified Ni-Co Supported Catalysts: Catalyst Characterization and Performance Evaluation

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Table S1. Acidity and reaction results of *w*KNiCo/SiO_2 and NiCo/SiO_2

Catalyst	Acidity (mmol NH_3 g^{-1})	Reaction results[a]	
		k_r (10^{-2} $mol^{0.2}$ $L^{-0.2}$ min^{-1})	$S_{m\text{-XDA}}$(%)
SiO_2[b]	0.014	/	/
NiCo/SiO_2	0.061	2.6	45.8
0.5NiCo/SiO_2	0.016	2.5	60.7
1KNiCo/SiO_2	0.007	2.7	91.3
2KNiCo/SiO_2	0.007	0.45	91.0

[a] Reaction conditions: 80 °C, 6.0 MPa, 5 g catalyst of 200~400 μm, 80 mL of toluene and 20 mL of methanol as solvent, 2.9 g of IPN feed, 0.086 g of NaOH, 180 mL min^{-1} H_2 gas flow, and stirring speed of 800 rpm.

[b] The SiO_2 sample was calcined at 400 °C for 4h before analysis.

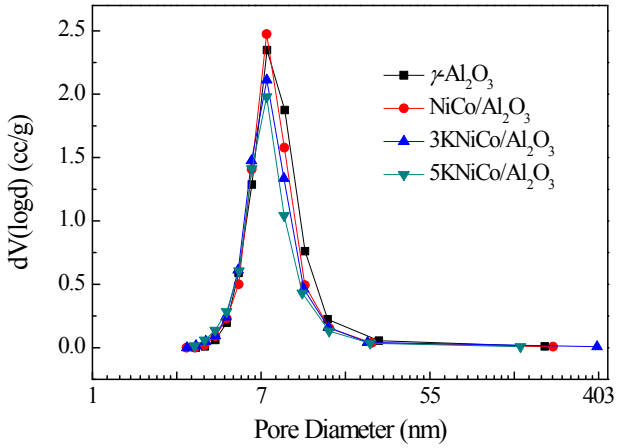

Fig. S1. Pore size distribution of γ-Al_2O_3, NiCo/Al_2O_3, and *w*KNiCo/Al_2O_3 (*w* = 3, 5)

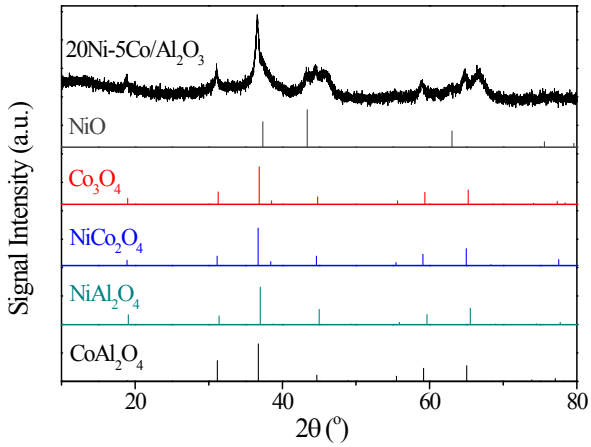

Fig. S2. XRD profile of 20Ni-5Co/Al_2O_3 and the standard spectra of NiO, Co_3O_4, $NiCo_2O_4$, $NiAl_2O_4$, and $CoAl_2O_4$.

The phase analysis was conducted on Jade 6 by matching the XRD profile of the catalyst with the standard spectra in the database.

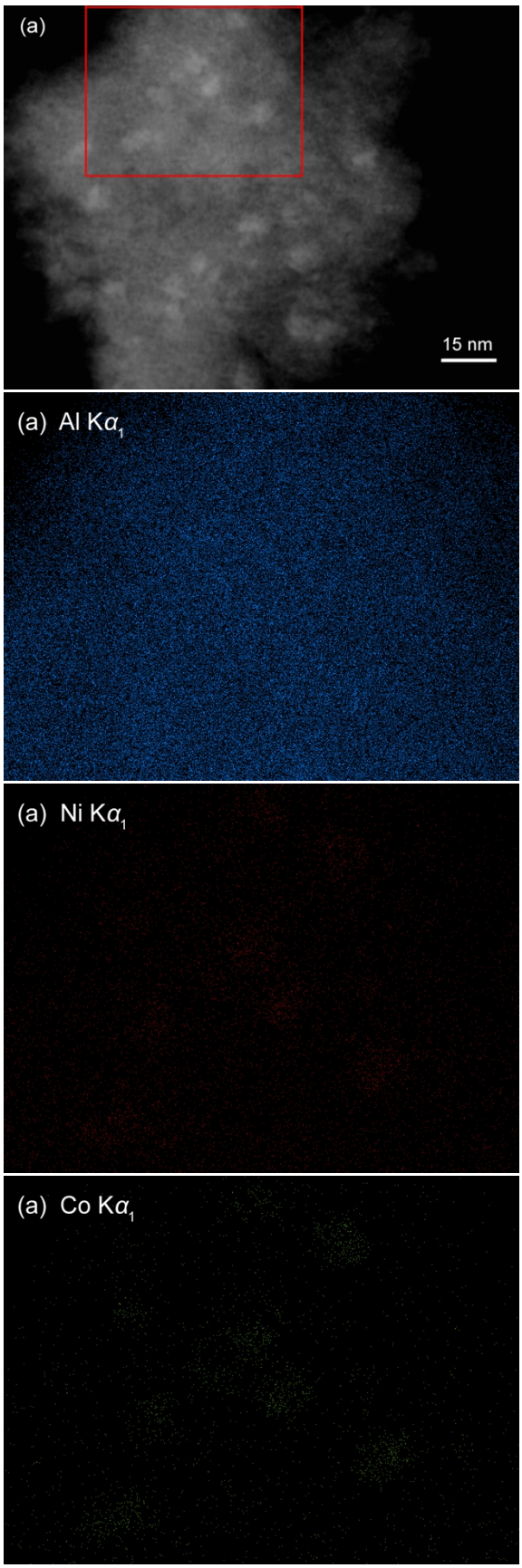

Fig. S3. (a) HAADF TEM image (part in the red square was tested by EDS) and EDS surface scanning results of $NiCo/Al_2O_3$

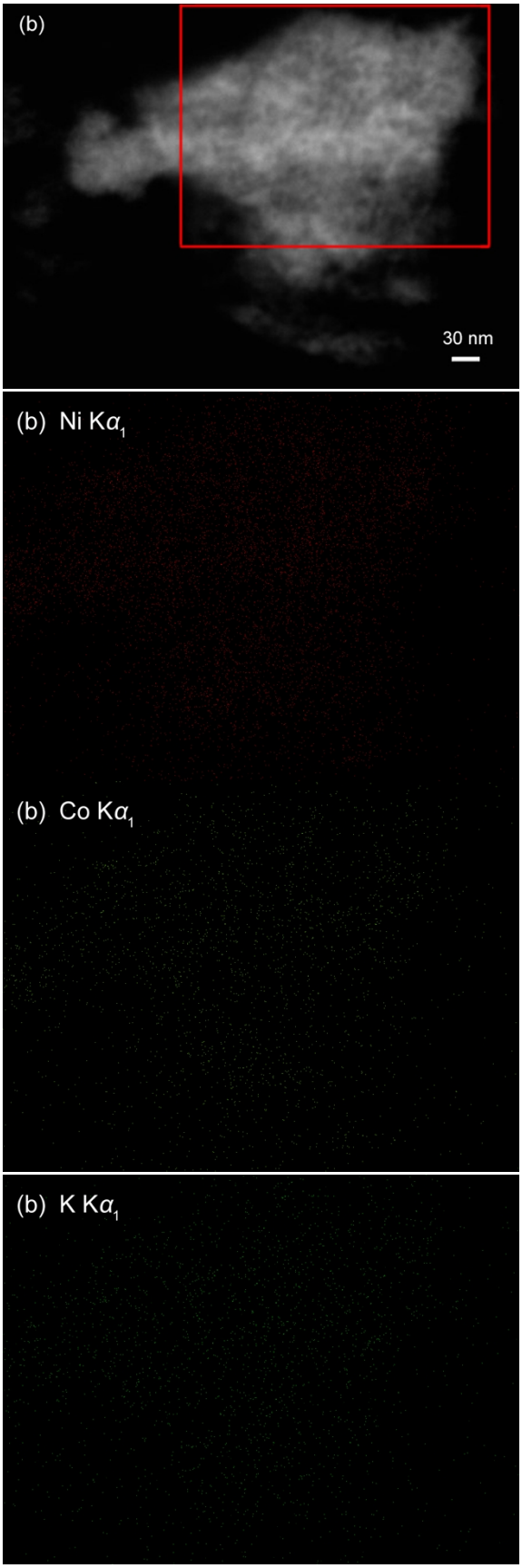

Fig. S3. (b) HAADF TEM image (part in the red square was tested by EDS) and EDS surface scanning results of 3KNiCo/Al_2O_3

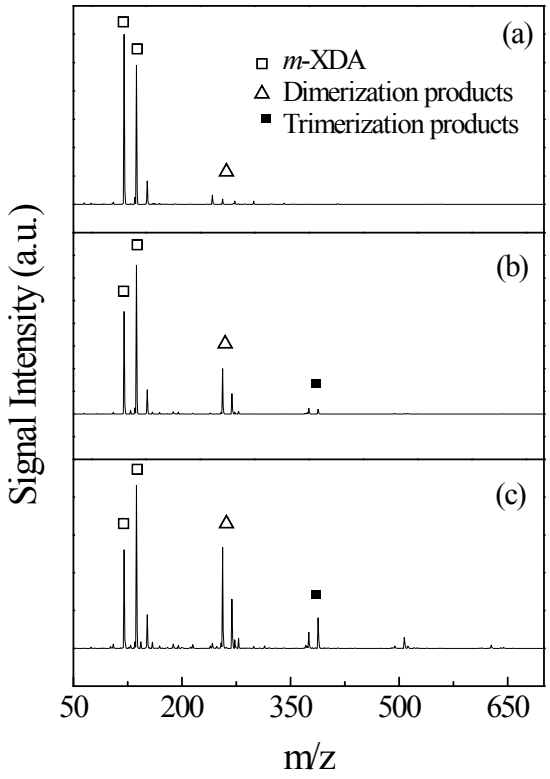

Fig. S4. Typical MS spectra of the final liquid samples

(a) product with 99.9% *m*-XDA selectivity (over $3KNiCo/Al_2O_3$); (b) product with 45.5% *m*-XDA selectivity (over $NiCo/Al_2O_3$); (c) product with 28.5% *m*-XDA selectivity (over another catalyst not included in Table 1)