Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Nonprecious mixed oxide catalysts Co3AlO and Co2NiAlO derived from nanoflowerlike cobalt-based hydrotalcites for highly efficient oxidation of nitric oxide

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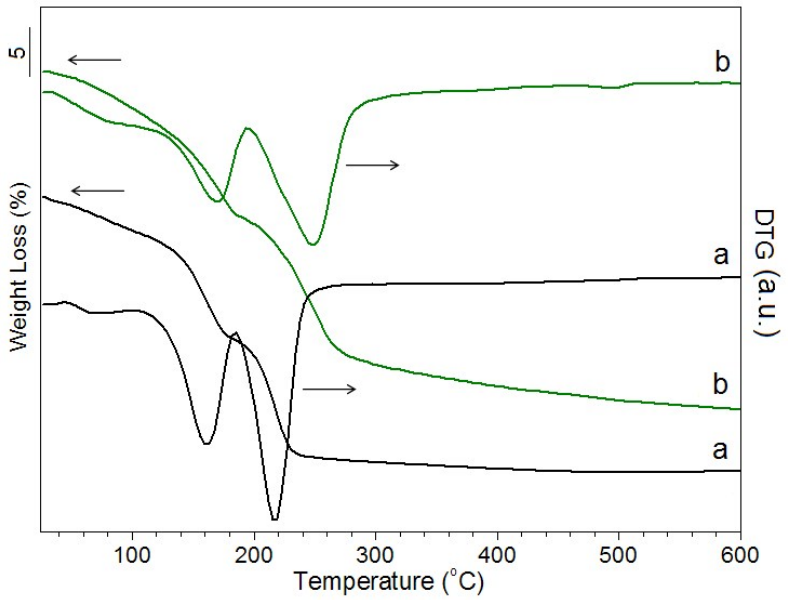

Figure S1 TG/DTG profiles of the hydrotalcite precursors Co3Al-HT (a) and Co2NiAl-HT (b).

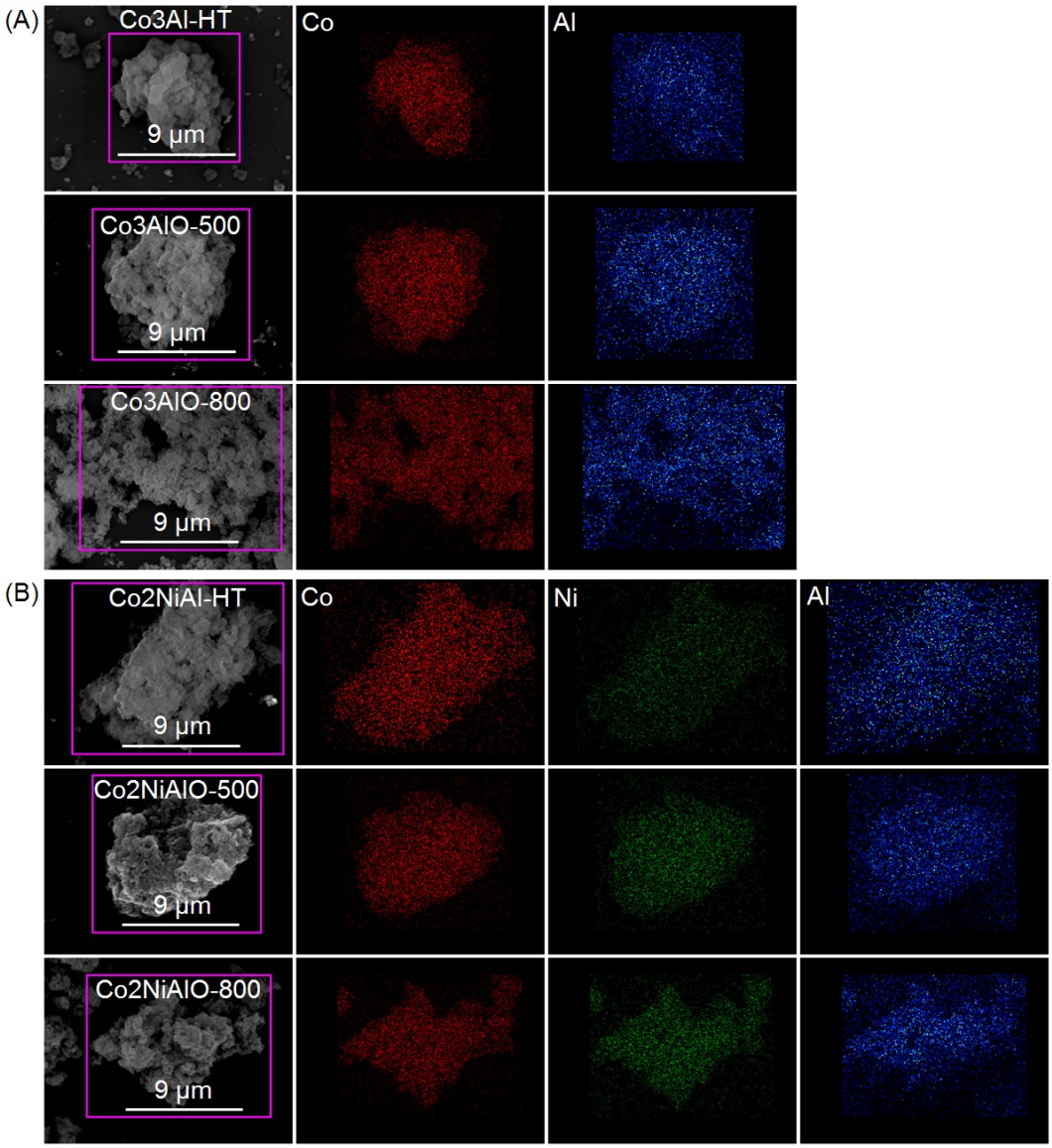

Figure S2 Mapping of (A) the hydrotalcite precursor Co3Al-HT and the catalysts Co3AlO-500 and Co3AlO-800 and (B) the precursor Co2NiAl-HT and the catalysts Co2NiAlO-500 and Co2NiAlO-800.

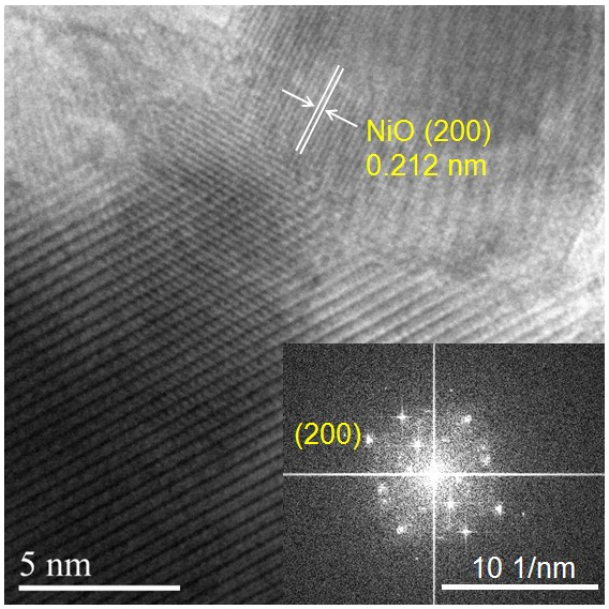

Figure S3 HRTEM lattice image and corresponding fast Fourier transform (FFT) pattern (inset) of Co2NiAlO-800.

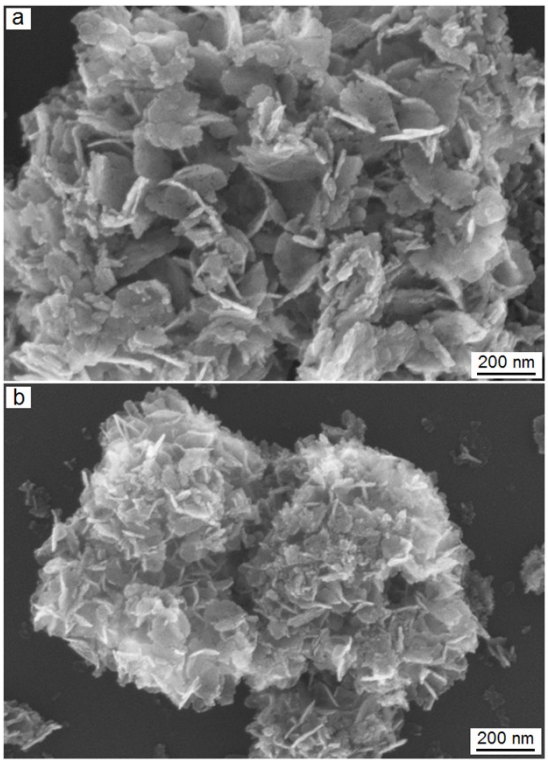

Figure S4 SEM images of the used catalysts Co3AlO-500-u (a) and Co2NiAlO-500-u (b) after the stability tests.

Table S1 Crystal structure parameters of the hydrotalcite precursors Co3Al-HT and Co2NiAl-HT

Samples	d_{003}/nm	d_{110}/nm	D_{003}/nm[a]	D_{110}/nm[a]
Co3Al-HT	0.76	0.1535	10.30	16.82
Co2NiAl-HT	0.75	0.1525	7.98	15.17

[a] Upon the Scherrer formula $D = 0.89\lambda(\beta\cos\theta)$ (λ is the X-ray wavelength (0.1542 nm), θ is the diffraction angle and β is the full width at half maximum (in radian))

Table S2 The calculated results of the apparent activation energy (E_a) and pre-exponential factor (A) of the catalysts Co3AlO-500 and Co2NiAlO-500

Temperature (°C)	Conversion (%)	Rate (mol g^{-1} s^{-1})
150	6.92	4.29×10^{-8}
160	8.13	5.04×10^{-8}
170	9.50	5.89×10^{-8}
180	11.51	7.14×10^{-8}
190	14.24	8.83×10^{-8}

Catalyst Co3AlO-500: Apparent activation energy E_a= 29.12 kJ/mol

Pre-exponential factor A = 19.44 mol g^{-1} s^{-1}

Temperature (°C)	Conversion (%)	Rate (mol g^{-1} s^{-1})
150	8.93	5.54×10^{-8}
160	10.75	6.67×10^{-8}
170	12.84	7.96×10^{-8}
180	15.43	9.57×10^{-8}
190	18.65	11.57×10^{-8}

Catalyst Co2NiAlO-500: Apparent activation energy E_a= 29.84 kJ/mol

Pre-exponential factor A = 18.39 mol g^{-1} s^{-1}

The apparent activation energy E_a and pre-exponential factor A were obtained by the Arrhenius plot of In*k* vs (-1/T). Reaction rate constant *k* was calculated from reaction rate $r = k\ P_{NO}^{a} P_{O_2}^{b}$, where *a* and *b* were the reaction orders determined from Figure 8 (D and E).