Supporting Information

Ru and Ru-Ni Nanoparticles on TiO_2 Support as Extremely Active Catalysts for Hydrogen Production from Ammonia Borane

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Table S1 Results of curve-fitting analysis of $RuNi/TiO_2$.

edge	shell	*N*	*R*/Å	$\Delta\sigma^2$/Å^2
Ru K-edge	Ru–Ru	5.4	2.64	0.026
	Ru–Ni	4.2	2.54	0.018
Ni K-edge	Ni–Ni	5.7	2.45	0.012
	Ni–Ru	4.2	2.54	0.016

N: Coordination number, *R*: distance, $\Delta\sigma^2$: Debye-Waller factor
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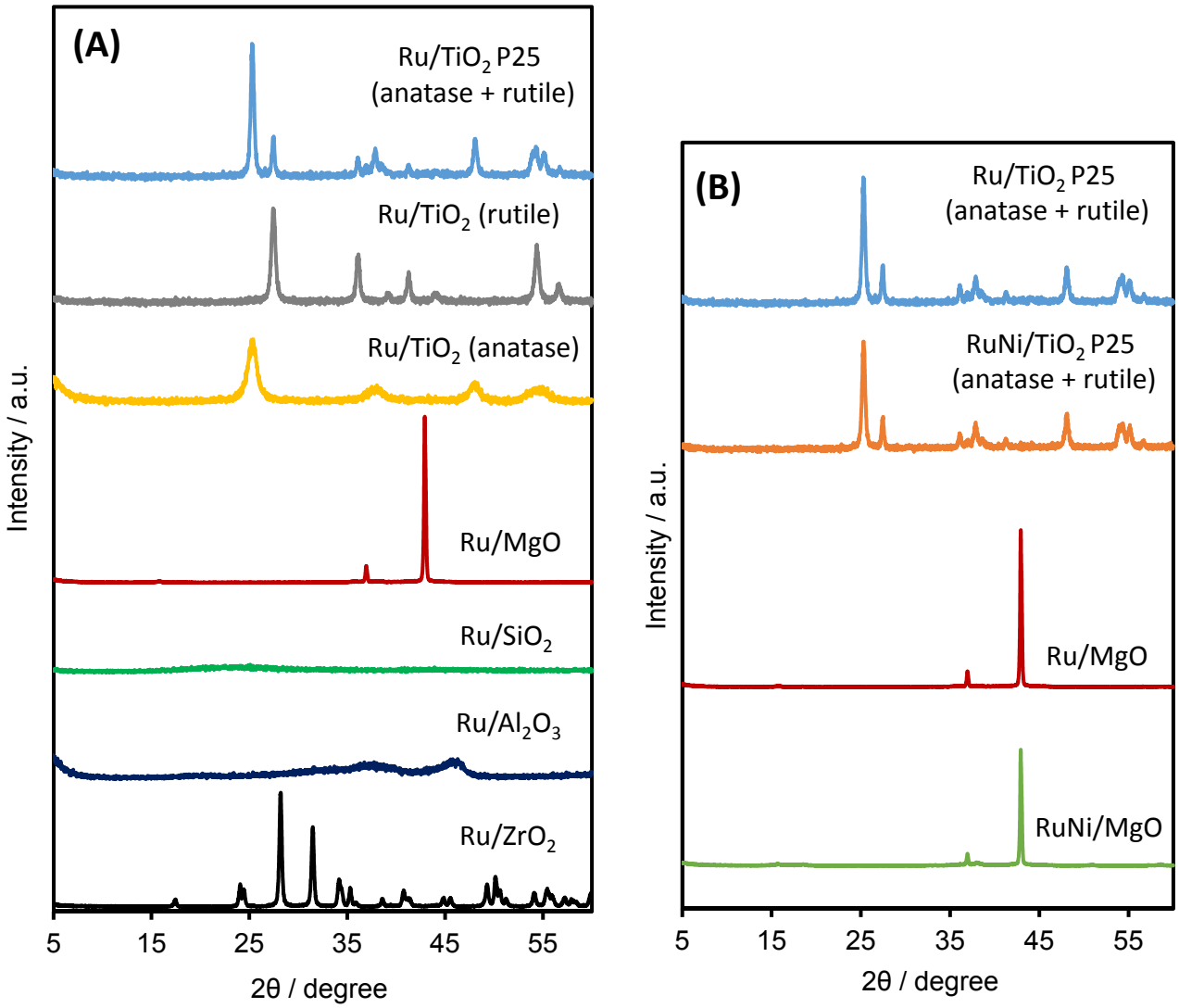

Figure S1. XRD pattern of (A) Ru-supported catalysts and (B) and RuNi-supported catalysts

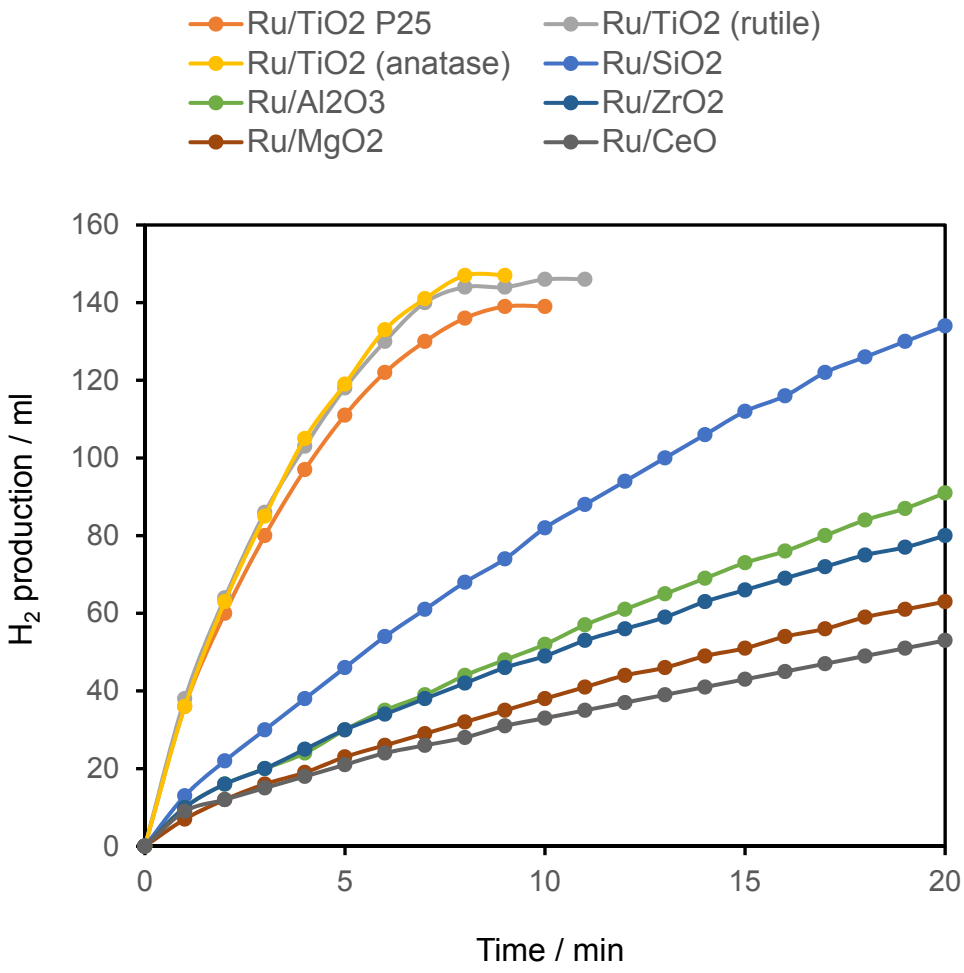

Figure S2. Time courses for hydrogen production from AB using various Ru catalyst.

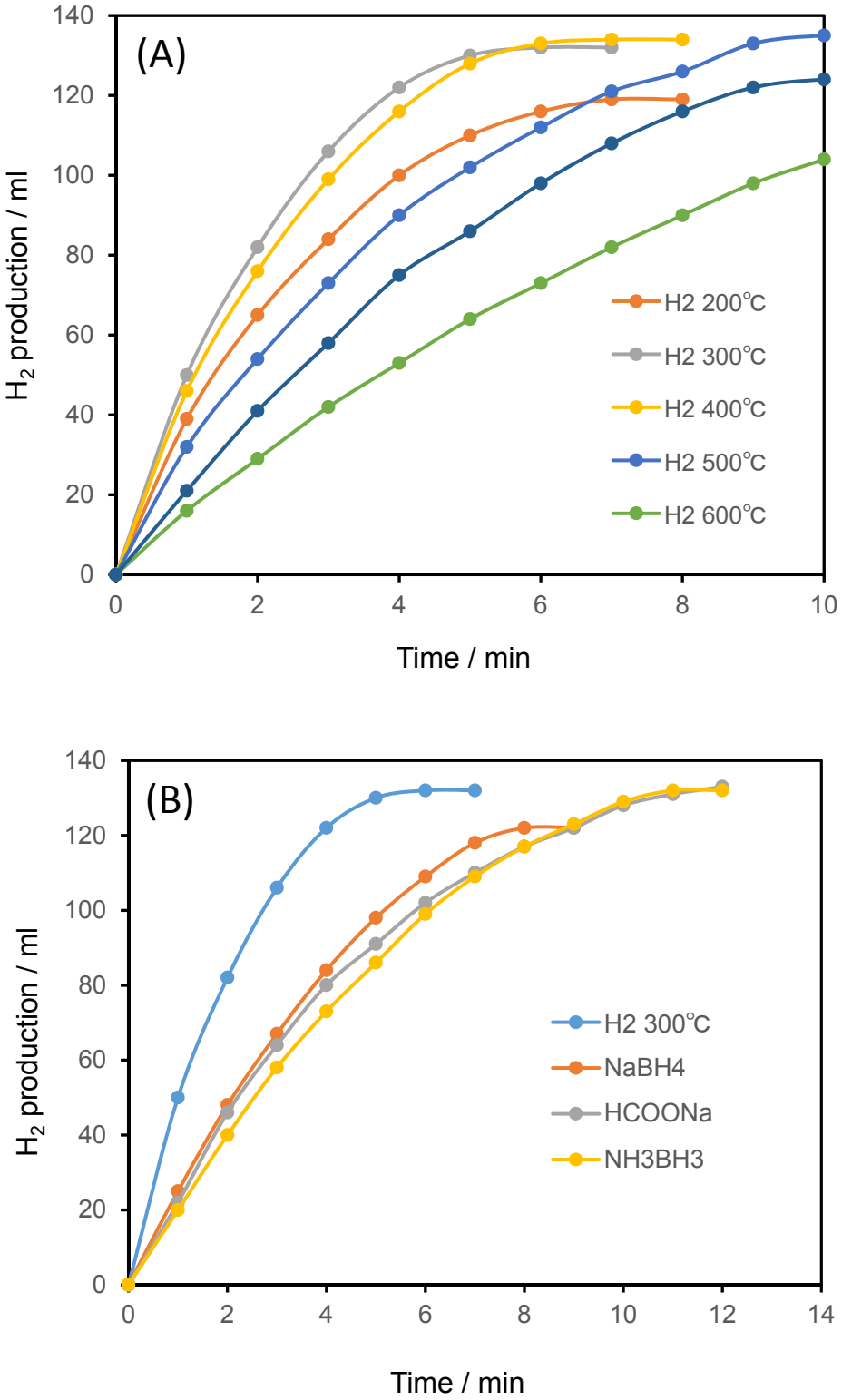

Figure S3. Time courses for hydrogen production from AB. (A) Effect of reduction temperature in the H_2 reduction, (B) Effect of reducing reagents

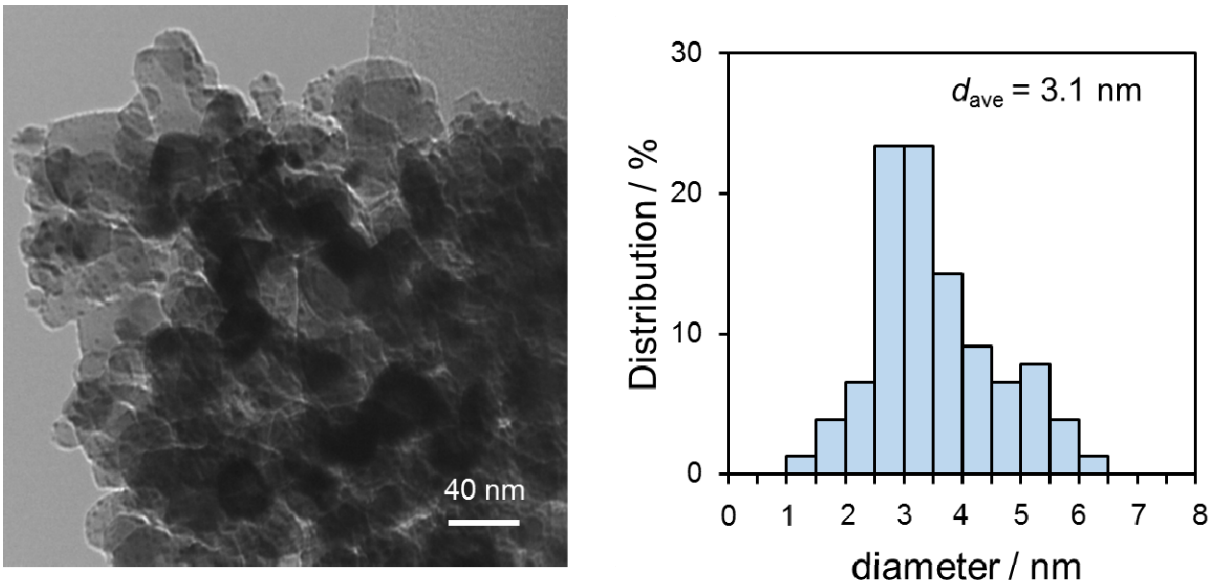

Figure S4. TEM image and size distribution diagrams of the Ru/TiO_2 P25 reduced at 600ºC.

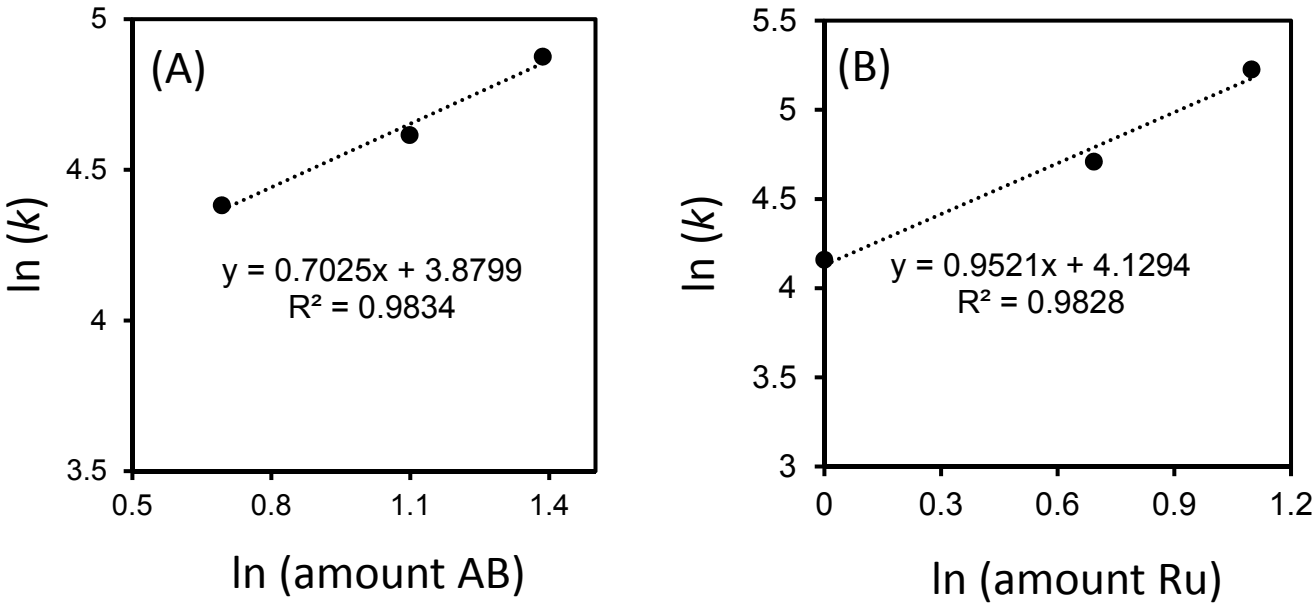

Figure S5. Logarithmic plots of the H_2 generation rate as a function of the AB concentration (A) and metal concentration (B).

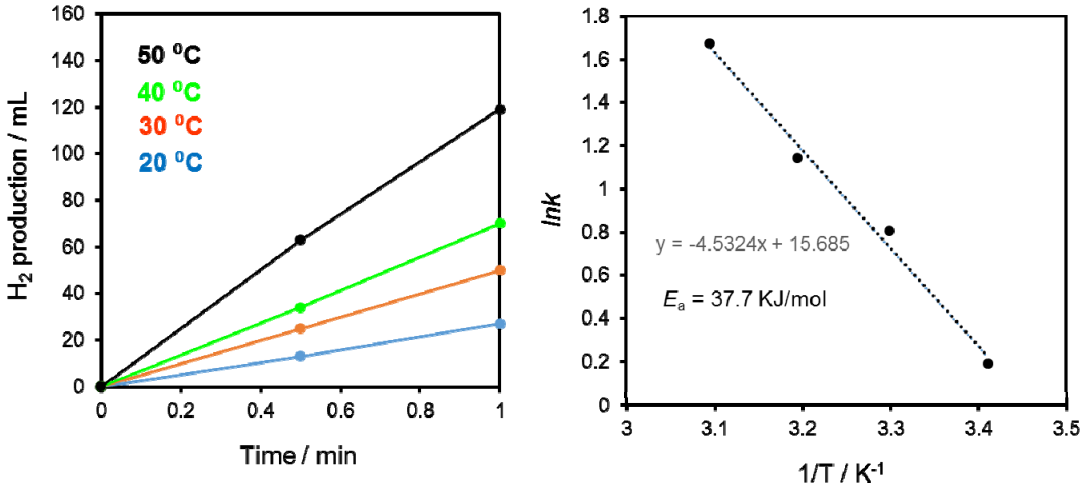

Figure S6. Effect of temperature and Arrhenius plots of lnk vs. 1/T for Ru/TiO_2 P25.

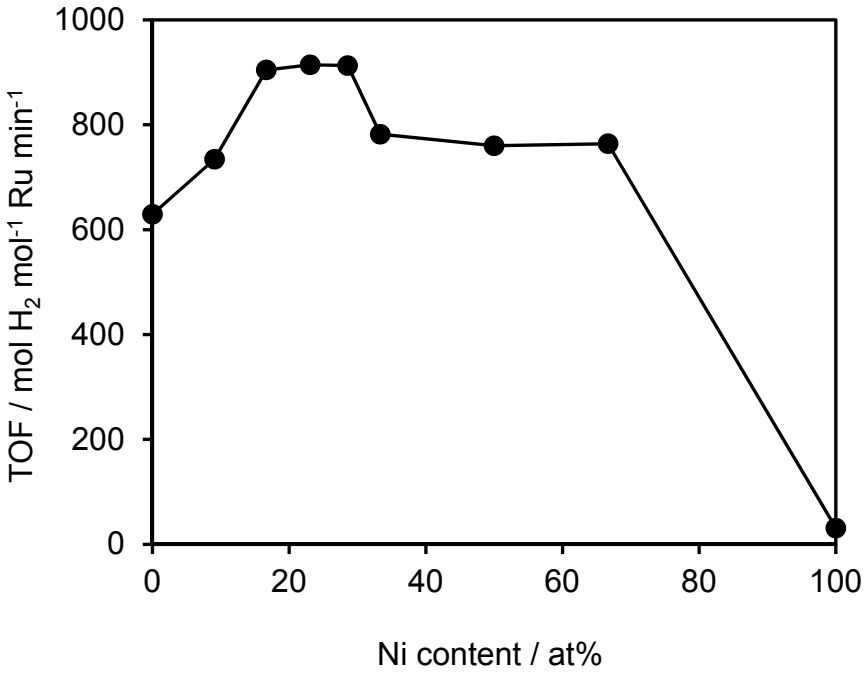

Figure S7. TON versus Ni content for RuNi/TiO_2 P25.

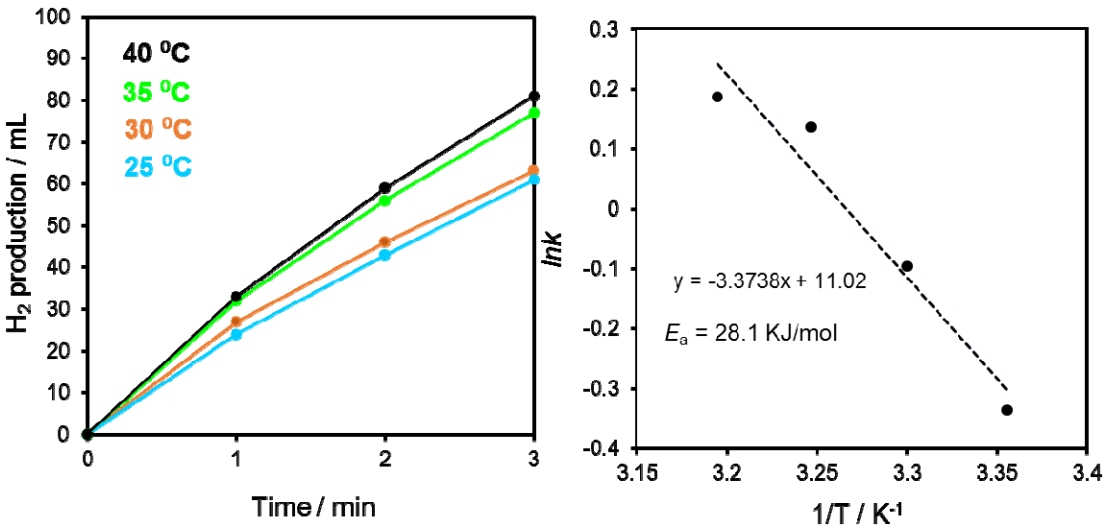

Figure S8. Effect of temperature and Arrhenius plots of lnk vs. 1/T for RuNI/TiO_2 P25.

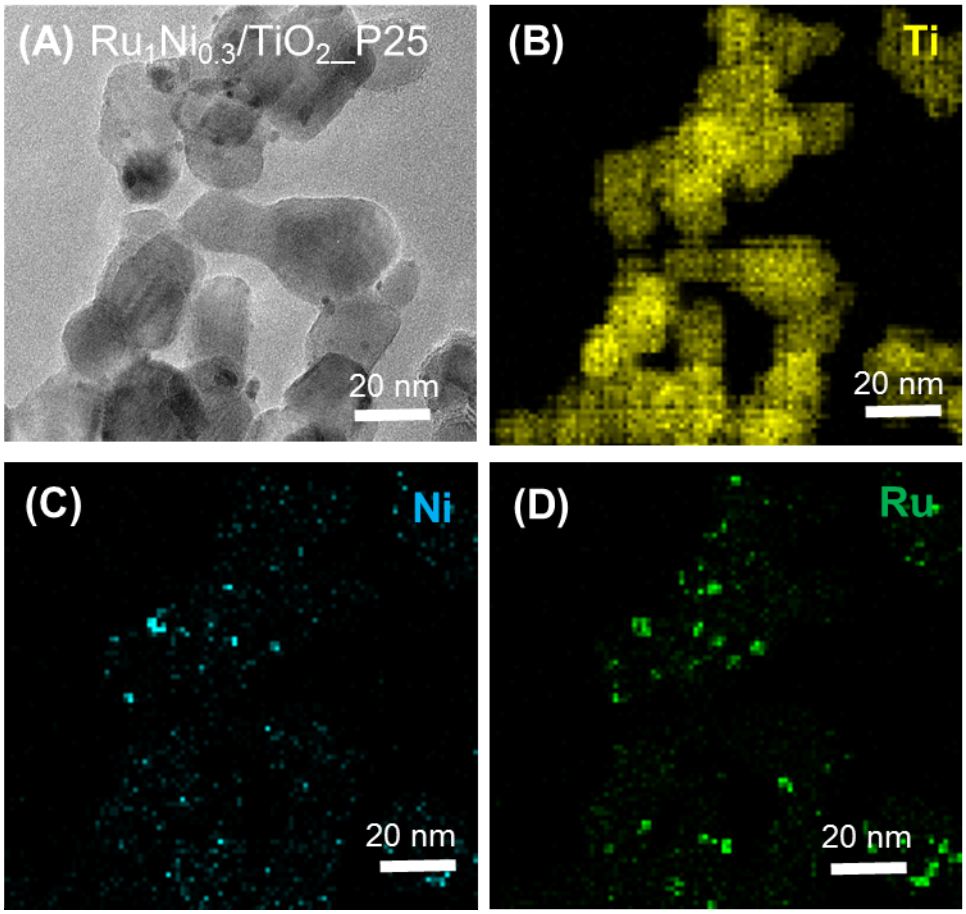

Figure S9. HR-TEM image and EDS elemental mapping of $RuNi/TiO_2$.

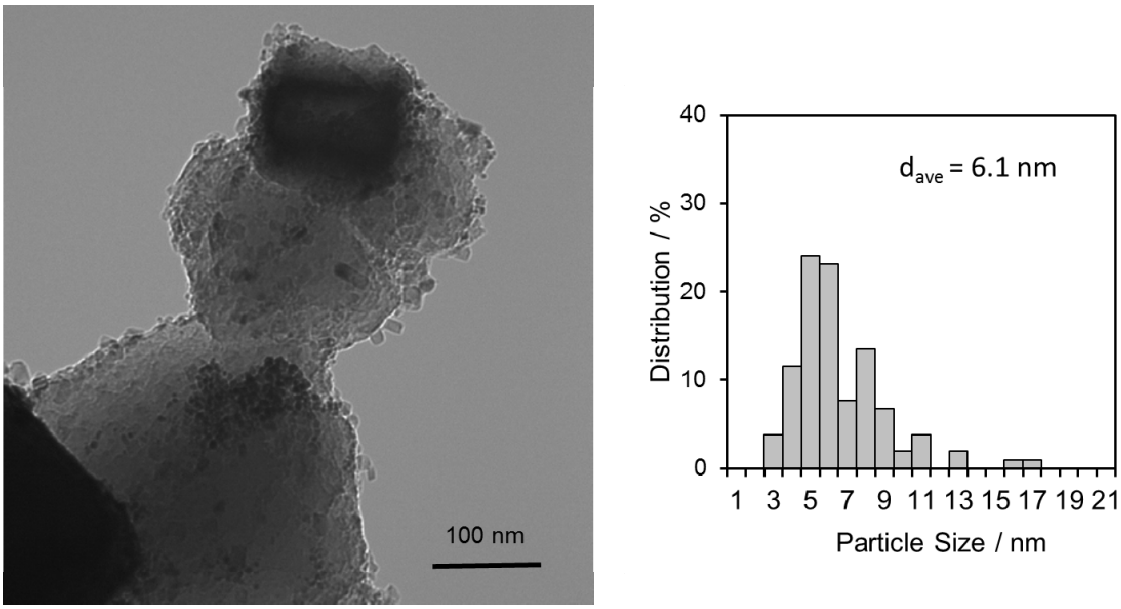

Figure S10. TEM image and size distribution diagrams of the RuNi/MgO.

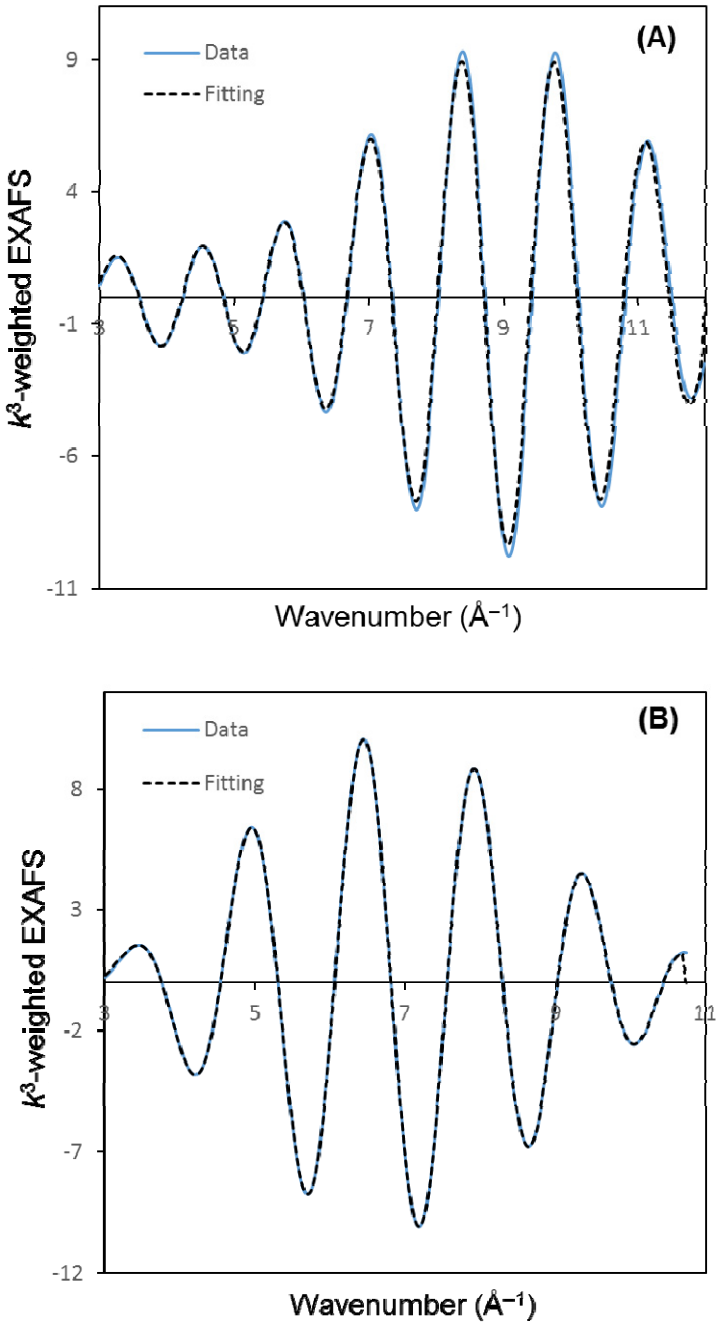

Figure S11. Inverse FT of the peaks in the (A) Ru K-edge and (B) Ni K-edge FT-EXAFS spectra of RuNi/TiO_2. The dotted line show the results of curve-fitting analysis in the range 3-12 $Å^{-1}$

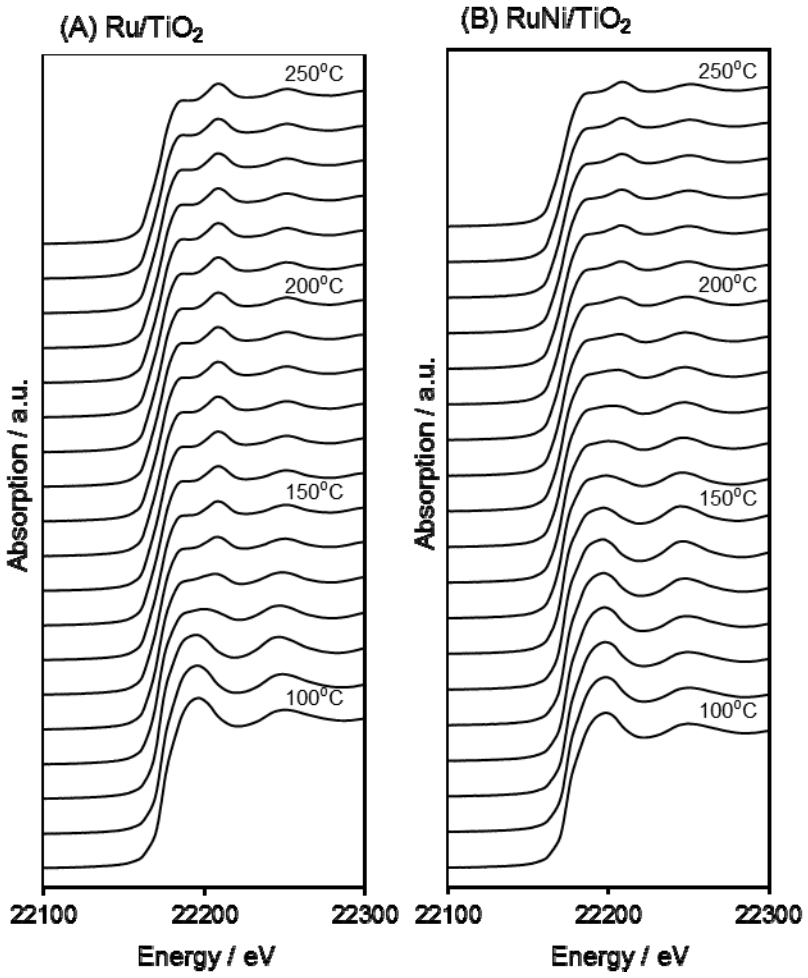

Figure S12. *In situ* XANES spectra at Ru K-edge of (A) Ru/TiO_2 P25 and (B) $RuNi/TiO_2$ P25.

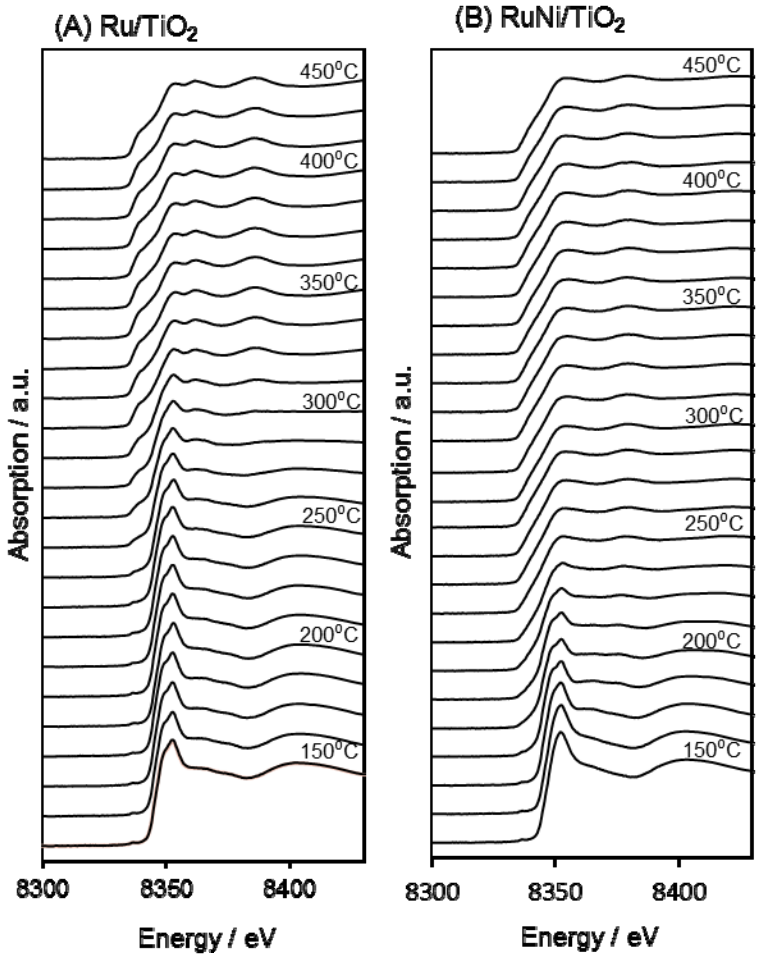

Figure S13. *In situ* XANES spectra at Ni K-edge of (A) Ni/TiO_2 P25 and (B) RuNi/TiO_2 P25.