Electronic supplementary information (ESI)

Regulating interaction of Ru nanoparticles and Eu_2O_3 support achieves enhanced activity for ammonia synthesis

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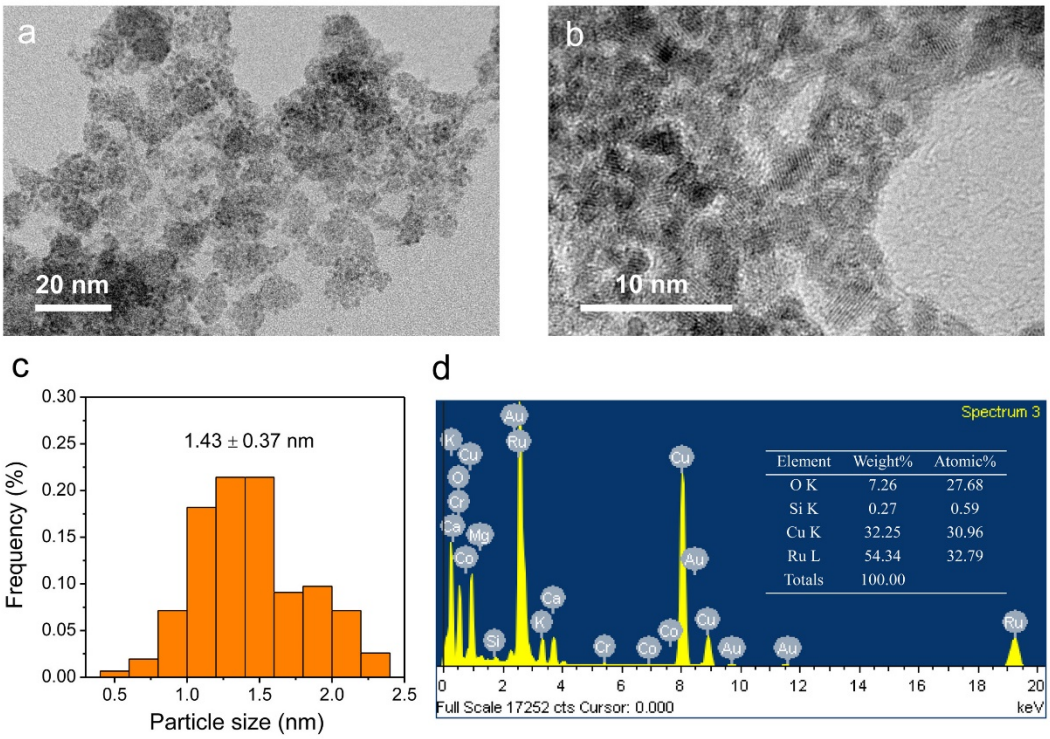

Fig. S1 TEM images in different scale (a-b), particle size distribution (c) and Energy Dispersive X-Ray (EDX) spectrum (d) of RuO_2 NPs.

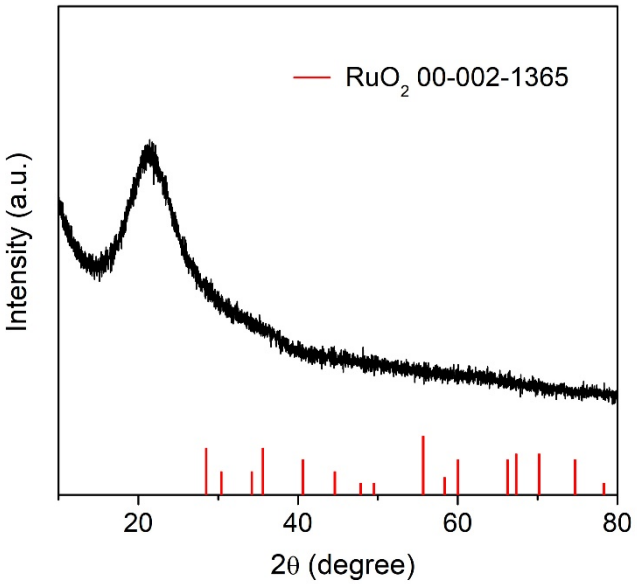

Fig. S2 XRD pattern of RuO_2 NPs.

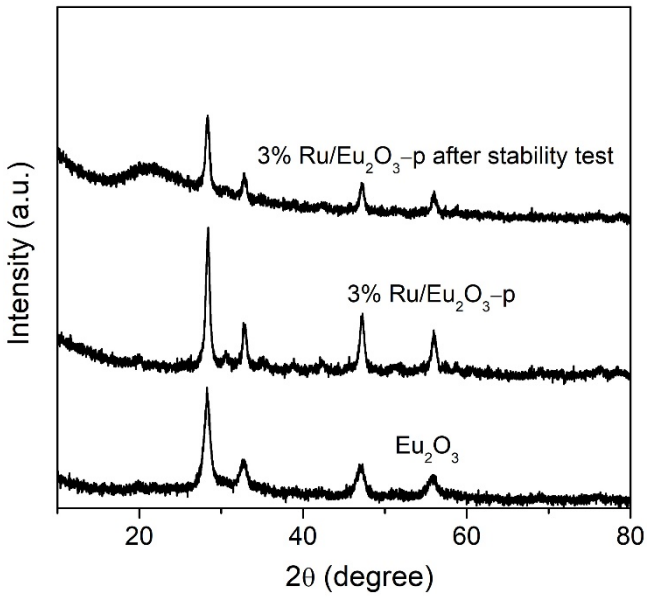

Fig. S3 XRD patterns of 3% Ru/Eu_2O_3–p and 3% Ru/Eu_2O_3–p catalyst sample obtained after stability test.

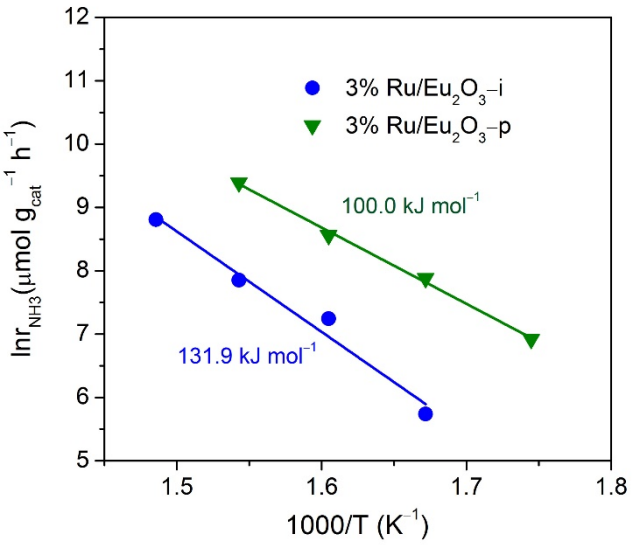

Fig. S4 Arrhenius plots of 3% Ru/Eu_2O_3–i (●) and 3% Ru/Eu_2O_3–p (▼).

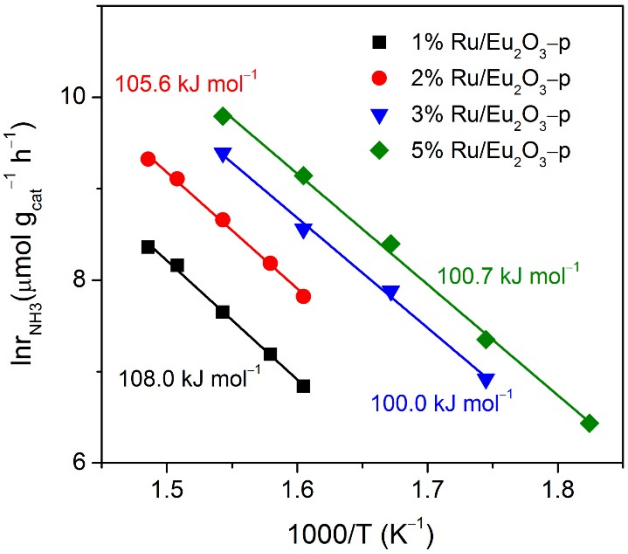

Fig. S5 Arrhenius plots of 1% Ru/Eu_2O_3–p (■), 2% Ru/Eu_2O_3–p (●), 3% Ru/Eu_2O_3–p (▼) and 5% Ru/Eu_2O_3–p (♦).

Table S1 Properties of Eu_2O_3, 3% Ru/Eu_2O_3–m, 3% Ru/Eu_2O_3–i and 3% Ru/Eu_2O_3–p catalysts.

Sample	Ru content[a] (wt%)	Ru content[b] (wt%)	Surface area (m^2 g^{-1})	Mean particle size[c] (nm)	Dispersion[c] (%)
Eu_2O_3	–	–	49.3	–	–
3% Ru/Eu_2O_3–m	0.89	2.10	33.2	~4.5	~26.8
3% Ru/Eu_2O_3–i	4.76	2.06	47.3	~3.5	~32.9
3% Ru/Eu_2O_3–p	0.69	3.08	52.2	~3.5	~32.9

[a] Determined by XPS.

[b] Determined by ICP-OES.

[c] Mean particle size and dispersion of Ru NPs were determined by TEM study using the equation of Borodziński and Bonarowska.