Electronic Supplementary Material (ESI) for Green Chemistry.

Natural zeolite supported Ni catalysts for hydrodeoxygenation of anisole

Penghui Yan, Eric Kennedy and Michael Stockenhuber*

[a]Chemical Engineering, School of Engineering, University of Newcastle, Callaghan, NSW, 2308, Australia

*Corresponding author: michael.stockenhuber@newcastle.edu.au

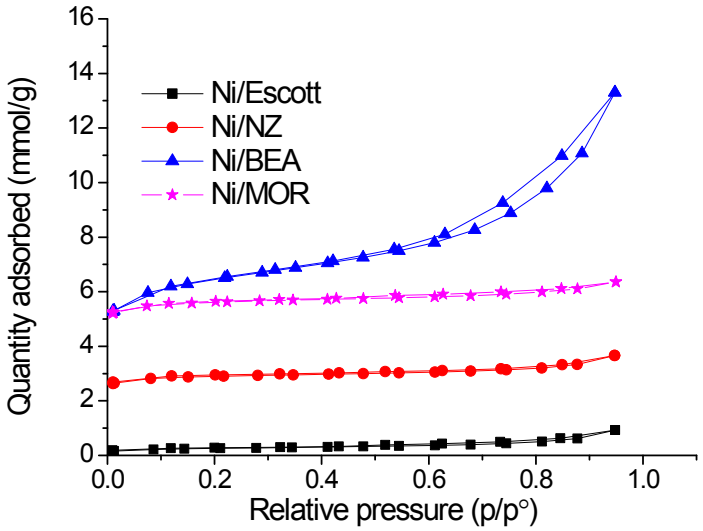

Figure S1. Nitrogen adsorption/desorption isotherms for reduced catalysts at -196 °C

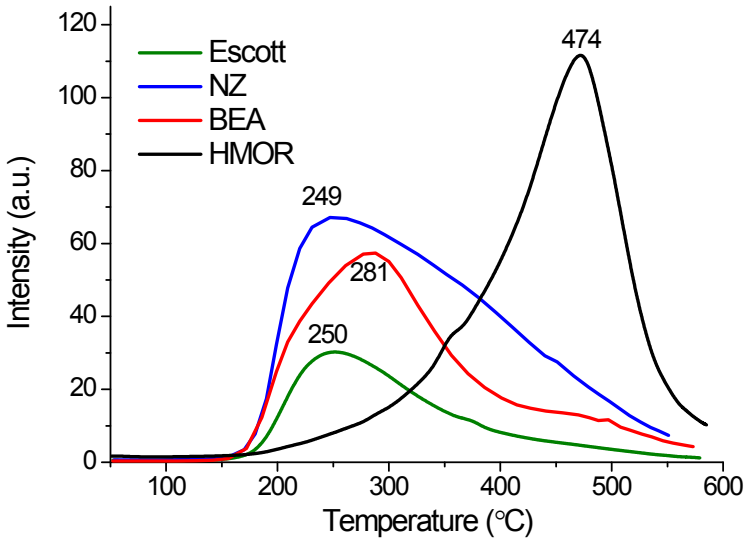

Figure S2. NH_3-TPD of pre-reduced supports

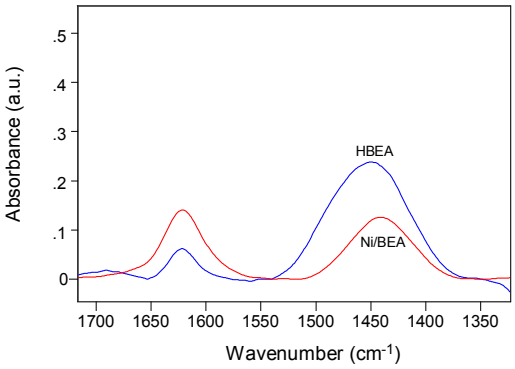

Figure S3. Infrared spectra obtained from adsorption of ammonia in HBEA and pre-reduced Ni/BEA. Samples contacted with 10 mbar pressure of NH_3 at 150 °C then were vacuumed; the spectra were normalised for wafer thickness using overtones of lattice vibrations between 1556 cm^{-1} and 2105 cm^{-1}

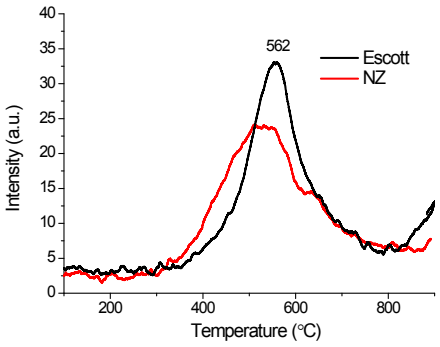

Figure S4. H_2-TPR profile of supports

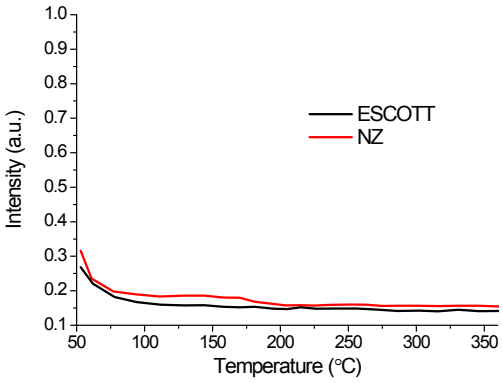

Figure S5. H_2-TPD of reduced supports

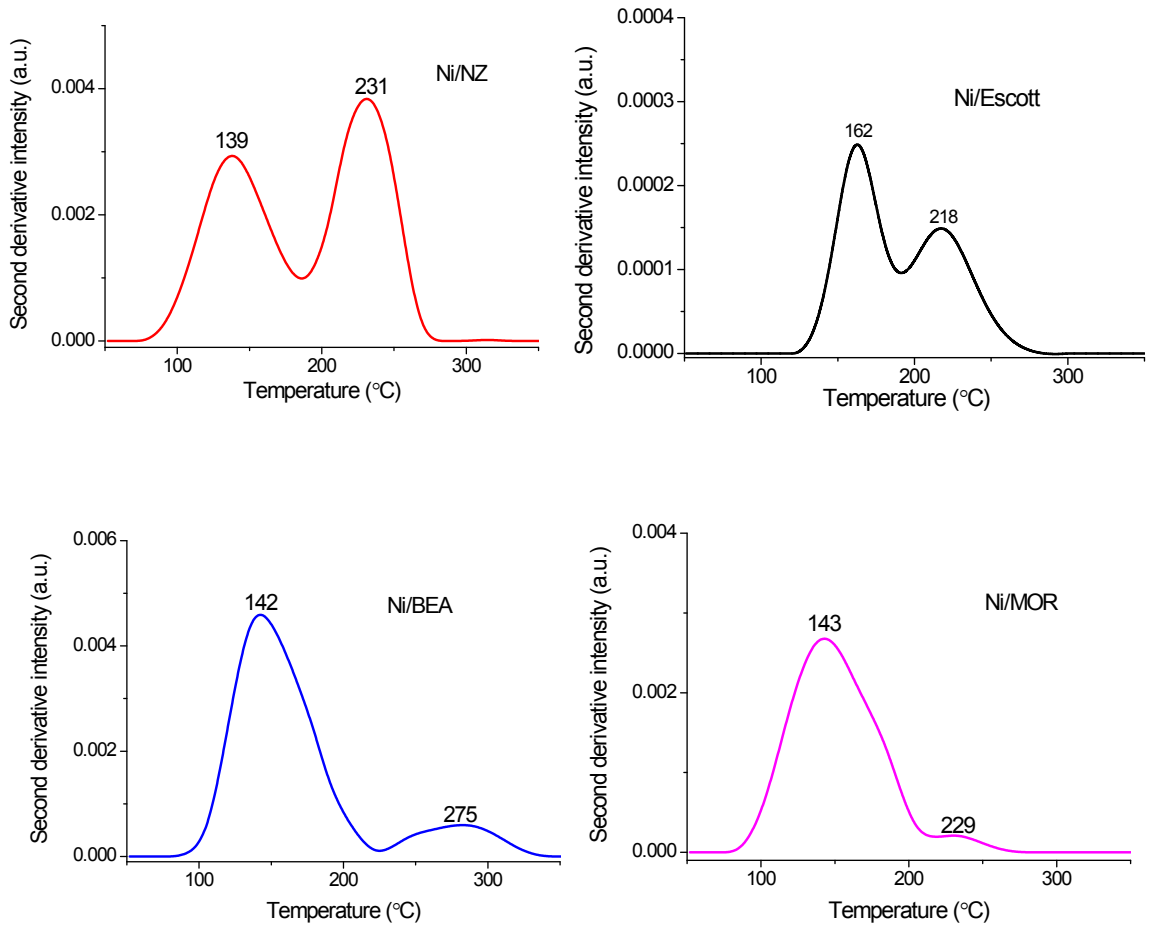

Figure S6. Second derivative H_2-TPD profiles of pre-reduced catalysts

Table S1. Estimated heats of desorption of reduced catalysts

Catalyst	T_{max}[a] (K)	ΔE_{des}[b] (kJ mol^{-1})
Ni/Escott	524	131.8
Ni/NZ	522	131.3
Ni/BEA	558	140.6
Ni/MOR	678	172.0

[a] Temperature at peak maxima of desorption from NH_3-TPD; [b] Heat of ammonia desorption.

Table S2. HDO of anisole over HBEA (Si/Al=12.5)

Catalyst	X-$_{anisole}$ (%)	Y-$_{phenol}$ (%)	Y-$_{methylanisole}$ (%)	Y-$_{methylphenol}$ (%)	Y-$_{dimethylphenol}$ (%)
HBEA	18.7	7.0	9.0	1.7	0.6

Reaction conditions: reaction temperature (230 °C), catalyst (0.05 g), WHSV (2.4 min^{-1}), P_{H2} (4.0 MPa), H_2 flow rate (150 mL/min), liquid flow rate (0.12 g/min);