

Supplementary Materials

Deoxygenation of Stearic Acid over Cobalt based-NaX Zeolite Catalysts

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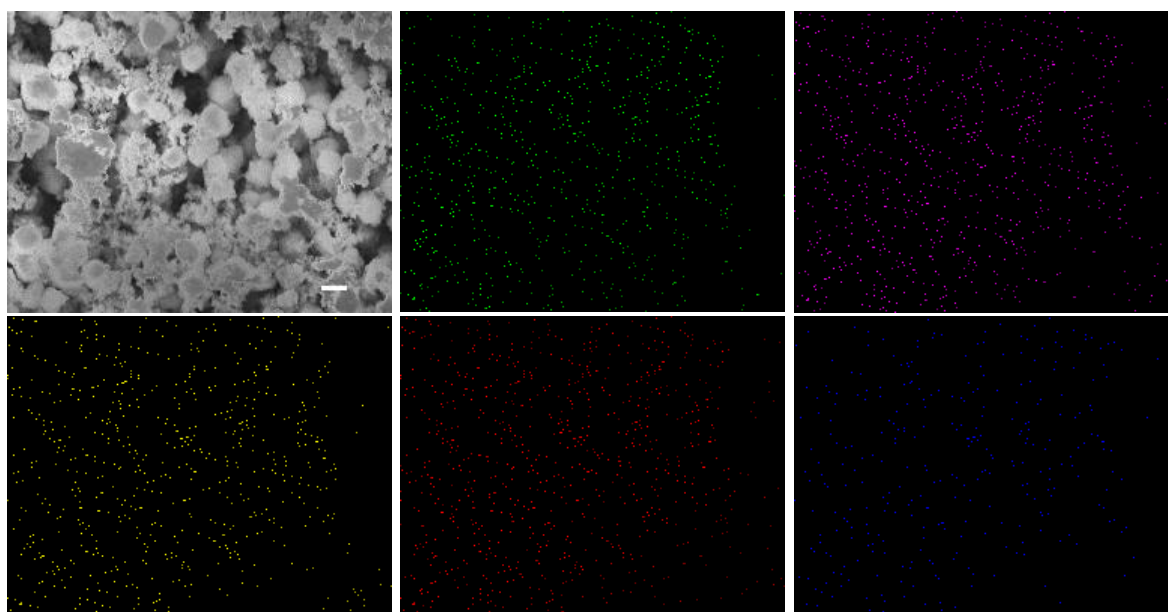


Figure S1. EDX mapping of Fresh Co/NaX. Co: Green, Si: Purple, Al: Yellow, O: Red, Na: Blue. Scale bar is 1 μm .

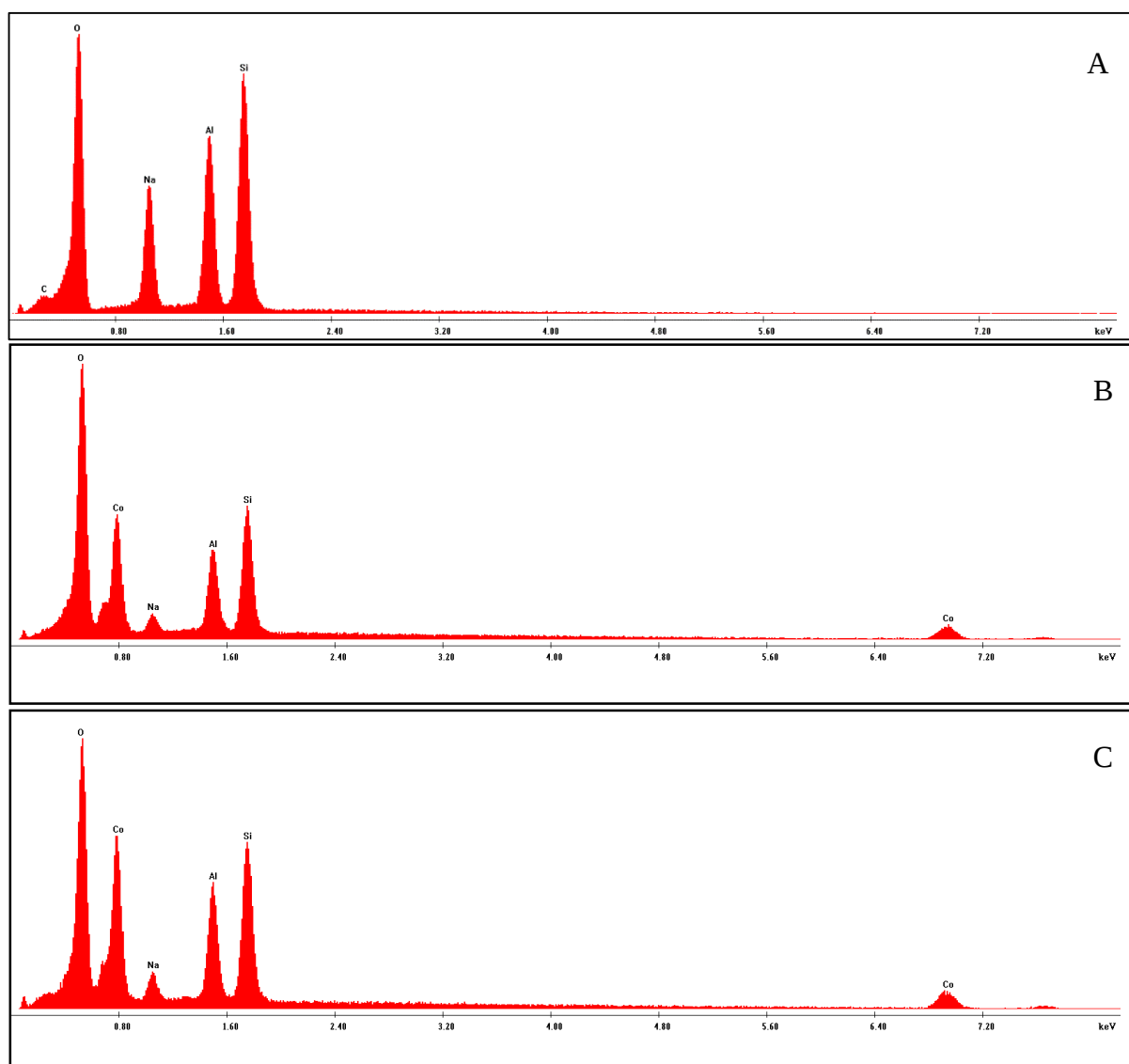


Figure S2. EDX spectrum for (A) NaX zeolite, (B) fresh Co/NaX, (C) and spent Co/Na

Table S1. Calculation of the Thiele modulus and effectiveness factor for Co/NaX. Method described by [1].

Reaction Temperature (°C)	280
Reaction Pressure (bar)	10
Viscosity at 25 °C (cP)	0.387
Viscosity at boiling point (cP)	0.19
Viscosity at 280 °C (cP)	0.175
Sastri Coefficient, α [2]	0.248
Molar volume at bp (cm ³ /mol)	163
Association factor, ϕ	1
Wilke Change D_{AB} (cm ² /s)	6.74E-06
Catalyst porosity for zeolites, ε [3]	0.5
Tau ¹ , τ [3]	3
Radius (cm) from SEM	5.00E-05
Effective diffusion (cm ² /s)	1.12E-06
Rate first order k (1/min)	1.20E-02
Thiele modulus, ϕ	0.08004
Effectiveness factor, η	0.9995732

References:

1. Snåre, M.; Kubičková, I.; Mäki-Arvela, P.; Eränen, K.; Murzin, D.Y. Heterogeneous Catalytic Deoxygenation of Stearic Acid for Production of Biodiesel. *Ind. Eng. Chem. Res.* **2006**, 5708–5715, doi:10.1021/ie060334i.
2. Poling, B.E.; Prausnitz, J.M.; O'Connell, J.P. The Properties of Gases and Liquids, 5th Ed., McGraw-Hill, 2001, 4.34, 9.61, 9.75.
3. Froment, G.F.; Bischoff, K.B.; De Wilde, J. Chemical Reactor Analysis and Design, 3rd Ed., Wiley, 2011, 3.6.