Supporting Information

Efficient aerobic oxidation of alcohols catalyzed by NiGa hydrotalcites in the absence of any additives

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Calculation of Weisz-Prater Criterion [1]

\[ \phi_{WP|A} = \frac{r_a R_p^2}{C_{s,A} D_{\text{eff},A}} \]

- \( r_a \) = observed reaction rate, mol/cm\(^3\) · s
- \( R_p \) = catalyst particle radius, cm
- \( C_{s,A} \) = the concentration of a reactant “A” at the catalyst surface, mol/cm\(^3\)

\( D_{\text{eff},A} \) = effective diffusivity of a reactant “A”, cm\(^2\)/s

\[ D_{\text{eff},A} = \frac{(1-\lambda)^2}{D_{b,A} + P\lambda} \]

where

- \( D_{b,A} \) = the diffusivity of a reactant “A” in the bulk phase, cm\(^2\)/s; calculated by Wilke-Chang method [2].
- \( \lambda \) = the ratio of the radius of the diffusing molecule to the pore radius

\( P \) = a fitting parameter, estimated according to ref. [3].

\[ \phi_{WP|O} = \frac{1}{2} \left( \frac{0.273 \times 10^{-6} \text{ mol}}{7.9 \times 10^{-4} \text{ cm}^3 \cdot \text{s}} \right) \left( \frac{1.8 \times 10^{-3} \text{ cm}^2}{1.11 \times 10^{-4} \text{ cm}^2 \cdot \text{s}} \right) = 1 \times 10^{-3} \]

\[ \phi_{WP|\text{benzyl alcohol}} = \frac{1.25 \times 10^{-4} \text{ mol}}{2.77 \times 10^{-5} \text{ cm}^2 \cdot \text{s}} \times 10^4 = 2.6 \]
Reference

