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## Selective Catalytic Reduction of NO Over Hierarchical Cu ZSM-5 Coated on Alumina Foam Support<sup>†</sup>

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Table 1 Chemical composition of Na-ZSM-5 sample mixture

Si/Al ratio	AIP(g)	TEOS (g)	NaOH(g)	TPAOH (g)	H <sub>2</sub> O(g)
10	1	5.1	0.039	0.59	52.35
20	1	10.2	0.039	0.59	52.35
50	0.2	5.1	0.039	0.59	52.35

Table 2 Geometric characteristics of the samples and correlations for mass transfer and friction factor<sup>1, 2</sup>.

Material type	Cell Density	Porosity	Dpore (m)	Sv [m <sup>2</sup> /m <sup>3</sup> ]	Mass transfer correlations	friction factor
FeCrAl	20PPI	0.94	1.10e-3	1400	Sh = 0.55Re <sup>0.5864</sup> Sc <sup>1/3</sup>	f = 11.12/Re + 0.16
FeCrAl	30 PPI	0.96	0.9e-3	2100	Sh = 0.41Re <sup>0.6147</sup> Sc <sup>1/3</sup>	f = 6.66/Re + 0.11
Al	10 PPI	0.92	1.2e-3	1800	sh = 1.13Re <sup>0.467</sup> Sc <sup>1/3</sup>	f = 10.5/Re + 0.13
Al	20 PPI	0.92	0.8e-3	2153	Sh = 0.68Re <sup>0.355</sup> Sc <sup>1/3</sup>	f = 3.66/Re + 0.08
Al	40 PPI	0.94	0.7e-3	4300	sh = 0.37Re <sup>0.398</sup> Sc <sup>1/3</sup>	f = 3.08/Re + 0.08

Table 3 Quantification of Cu dispersion in Cu-ZSM-5 foam catalysts

Samples	Volume Adsorbed (ml/g)	Metal loading (%)	No of moles of metal on the surface (mmoles/g)	Total moles of metal on the catalyst (mmoles/g)	Metal Dispersion (%)	Active metal surface area (m <sup>2</sup> )
Cu-ZSM-5-10	8.56	0.9	3.93	14.16	27	15.2
Cu-ZSM-5-20	16.92	0.8	5.82	12.58	46	20.4
Cu-ZSM-5-50	8.52	0.7	4.72	11.01	42	12.6

Table 4 Mass transfer and pressure drop correlation<sup>1</sup>

Material	Mass transfer correlations	Friction factor correlation
Cordierite monolith	Sh = 2.696[1+0.139Re.Sc(d/L)] <sup>0.813</sup>	f = 14.23/Re(1+0.045/(L/Dh.Re)) <sup>0.5</sup>
Packed bed	Sh=2+0.6Re <sup>0.5</sup> Sc <sup>1/3</sup>	Ergun Equation
Cu ZSM-5 foam	Sh=0.47Re <sup>0.7</sup> Sc <sup>1/3</sup>	f=1.4/Re +0.011

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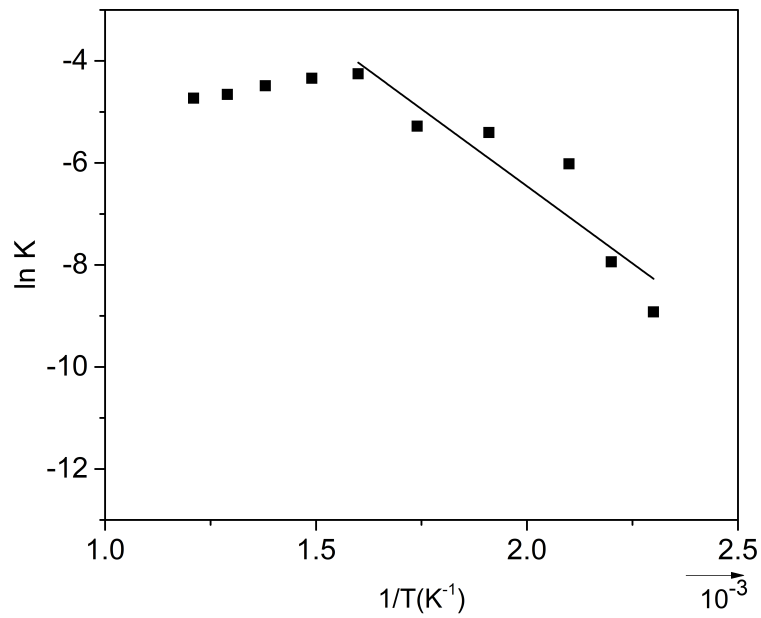


Fig. 1 Reaction rate in Arrhenius coordinates ( $K^{-1}$ ,  $s^{-1}$ ) for Cu ZSM-5-20 deposited on 30 PPI  $\alpha$  alumina foam

## References

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