Effect of the Acidity of HZSM-5 Catalyst on Coke Deposition in Methanol-to-Hydrocarbon (MTH) Reaction

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Coke deposition during methanol conversion to hydrocarbon over HZSM-5 has been studied in a fixed bed reactor at 500°C. The HZSM-5 catalysts with SiO_2/Al_2O_3 ratios of 40 and 280 were synthesized and characterized by XRD, SEM, N_2-sorption and NH_3-TPD. The nature of coke was investigated by N_2-sorption, EA and UV-VIS. If the acidity of HZSM-5 is low (SiO_2/Al_2O_3=280), the coke deposited are mainly mono- or bi-aromatics which did not affect the catalyst activity significantly. On the other hand when the acidity is high (SiO_2/Al_2O_3=40), the coke deposited contain polycyclic aromatics with 3 or 4 fused rings which lead to significant deactivation after 24 h.