Stability of supported Pt nanoparticles for selective reduction of N_2O with H_2

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The present study has been focused on an on-stream stability of silica-supported Pt nanocrystallites for the selective reduction of N_2O by H_2 at low temperatures, such as 90°C-135°C. Samples of the supported Pt with its different loadings were prepared using an ion exchange technique and characterized by H_2 adsorption, XRD, HRTEM and *in situ* DRIFTS measurements. Both activity and stability in this N_2O reduction with the catalysts were strongly dependent on the amounts of Pt and its nanoparticle sized, the ratio of H_2/N_2O fed, and the reaction temperatures chosen, In case that a sample of 1.72% Pt/SiO_2 was employed for the reduction at 90°C, it was very difficult to obtain a steady-state N_2O conversion, which might be associated with the pore blockage by H_2O that is produced during the reaction. At higher temperatures, such as 135°C, the extent of such deactivation was significantly improved. The supported catalysts consisting of small Pt nanoparticles less than 5 nm possessed a better stability for the N_2O reduction in the presence of H_2 .