

Characterization of a commercial $V_2O_5-WO_3/TiO_2$ catalyst used at an NH_3 -SCR de NO_x process of an oil-fired power plant

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A commercial $V_2O_5-WO_3/TiO_2$ catalyst used for 20,000 h at a domestic oil-fired power plant has been extensively characterized using BET, XRF and ICP measurements to ascertain the reason why it gives not only very higher de NO_x activity at temperatures less than 350°C than that indicated for a fresh catalyst, but also largely increased N_2O formation, up to 160 ppm, at high temperatures, such as 480°C. Based on the BET measurements with the used and fresh samples, changes in the size distribution of pores and their volume were visible for the used catalyst; however, this was not associated with the two noticeable differences between the both samples. One is the ICP results which represented significant increase, by 1%, in a V_2O_5 content after such an on-site use and this may be related to the enhancement in the low temperature activity. Another point is the XRF measurements in which very larger amounts of Mo were detected with the used sample. These results were very consistent with de NO_x performances and the extent of N_2O production levels of the used catalyst after treatments in a mild HCl solution to eliminate alien metal oxides deposited upon the on-site operation.