Catalytic decomposition of N-nitrosodimethylamine on NaY zeolites

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The catalytic decomposition of N-nitrosodimethylamine(NDMA) on NaY zeolite has been studied by in-situ infrared technique and thermogravimetric analysis with a mass detector(TGA/MS). Nitrosamines are well-recognized teratogens and carcinogens in animals and are considered potentially carcinogenic in humans. With a characteristic functional group of -N-N=O in their structures, nitrosamines can cause serious health risk even in trace amounts. NDMA, which contains -N-N=O functional group with two methyl groups, is selected as a model compound for this work. The zeolite NaY is well known to possess the abilityof selectively absorbing nitrosamines from the mainstream smoke of cigarettes. In this work, we investigate the decomposition patterns of N-nitrosodimethylamine (NDMA) on NaY zeolite with the aid of thermal energy to get rid of nitrosamines from smoking. In-situ FTIR spectroscopy is used to determine the nature of surface species and reaction intermediates. TGA/MS is also employed as a powerful tool to reveal adsorption or degradation of NDMA.