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Preface

This issue consists of papers presented at a symposium sponsored by the Petroleum Chemistry Division of ACS on the reduction of NO_x/SO_x from combustion sources, which was held at the ACS Las Vegas meeting on 7–11 September 1997. This symposium was organized by Professor Umit Ozkan of Ohio State University and James J. Spivey of Research Triangle Institute.

Research in this area is focused, for the present, on control of NO_x rather than SO_x. The focus on NO_x reflects the greater difficulty in removing NO_x from combustion gases and the need for more research on both catalysts and reducing agents which can be used with a wide range of gases. Two of the 17 papers in this issue deal with SO_x removal, and both of these include research on NO_x as well. The first of these two papers is by J. Blanco et al. (Instituto de Catalisis y Petroleoquimica, Madrid, Spain), who discuss a process in which two monolith beds in series are used; the first for NO_x reduction with ammonia and the second for SO_2 oxidation to SO_3, and recovery as sulfuric acid. The second of these papers, by J. Mitome et al. (Ohio State University, Columbus, OH), studies the effect of SO_2 and water vapor on the activity of Pd/TiO_2 for the reduction of NO with methane. They show that methane forms a CH_x species on the metal, which reacts directly with NO.

The papers on NO_x reduction deal with three general areas: mechanistic studies on conventional vanadia-based SCR catalysts, the use of reducing agents other than ammonia (e.g. unburned hydrocarbons in the exhaust gas), and NO decomposition. In the first area, the paper by L. Lietti et al. (Politecnico di Milano, Italy) presents research results on various vanadia-based catalysts, showing that the roles of titania and the nature of the active vanadia site are still not completely understood. In the second area, the use of hydrocarbon reducing agents, including methane, CO, methanol, propene, propane, and even decane are presented. For example, H. Ohtsuka et al. (Osaka Gas, Japan) examine Co/β zeolite and show that Co_3O_4 promotes NO_x reduction at low temperatures but decreases the selectivity at high temperatures. In the final area, NO decomposition, there are many questions that must be answered before this type of catalyst can be used industrially. Of the papers that deal at least in part with NO decomposition, each focuses on a different catalyst. These ranged from heteropoly acids (R. McCormick et al., Colorado School of Mines, Golden, CO), perovskites (Y. Yokoi et al., Tokyo Gas, Japan), to cobalt oxide (P. Park et al., Northwestern University, Evanston, IL).

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