the catalysts used. Reasons are given to explain the experimentally-observed differences in the kinetics due to changes in the reaction conditions, i.e., nature of the cationic salt, reaction temperature, partial pressures of the reactants.

A Novel Method of Investigation of Heterogeneous Catalytic Reactions: Decomposition of Ammonia on Platinum

By YA. M. FOGEL, B. T. NADIKTO, V. F. RIBALKO, R. P. SLABOSPEETZKY, I. E. KOROBCHANSKAYA, AND V. I. SHVACHKO
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A novel method of investigation of heterogeneous catalytic reactions is proposed. This consists of simultaneously observing the course of the I(T) curves for the ions produced by ionization of the gas around a catalyst and for the secondary ions being knocked out from the catalyst surface by a beam of the primary ions (I is the intensity of certain lines in mass spectra; T is a catalyst temperature).

This method was used in studying the mechanism of catalytic decomposition of ammonia over platinum. The mechanism of poisoning and reactivation of the plantinum catalyst was determined. The experimental data show that decomposition of ammonia involves two stages: during the first stage, adsorbed NH_3 molecules are decomposed into NH and H_2; during the second stage, pairs of adsorbed NH particles react to form N_2 and H_2.

Abstracts from Shokubai (Catalyst)

Shokubai (Catalyst) publishes both original articles and reviews or translations of articles appearing originally in languages other than Japanese. The following abstracts are of original Japanese language articles only.

Acidity and Activity of Silica-Alumina Catalysts

By TADAO SHIBA, TAKAMASA AONUMA, KAZUAKI YOSHIDA, HIDESHI HATTORI, AND MASAO SATŌ
From Tokyo Institute of Technology, Meguro-ku, Tokyo, Japan

The activities of gel-mixed, co-gelated, and co-precipitated silica-alumina and alumina catalysts for such reactions as the polymerization of olefins, the cracking of cumene, and the decomposition of isobutane were measured, and their dependence upon the acidity of the catalyst surfaces was examined.

For the polymerization and the cracking of cumene, a correlation between the catalytic activities and the protonic acidity has been established, though not directly parallel. The activity for the decomposition of isobutane, on the other hand, revealed to be approximately proportional to the nonprotonic acidity. The change in the catalytic activity for isobutane cracking with reaction time and the reaction products in isobutane conversion were studied. The role of the nonprotonic sites in the cracking of paraffins has been discussed.

The Decomposition of Hydrogen Peroxide by Hydroxyl Ion in Homogeneous Aqueous Solution

By SYOICHI OKI AND YOSHIHISA KANEKO
From the Faculty of Liberal Arts, Utsunomiya University, Utsunomiya, Japan

The reaction rate of hydrogen peroxide decomposition has been determined near room temperatures in a pH range from 11.5 to 15.0, by means of titration with potassium permanganate solution. The following results were obtained: The specific reaction rate increases linearly with the concentration of hydroxyl ion until the pH reaches 13.4, above which the rate suddenly begins to decrease; it again increases above pH 14.0 linearly with the square of hydroxyl ion concentration. The pH range in which the N-shape variation of the rate has been observed is nearly independent of the reaction temperature and the type of positive ion in the solution, i.e., sodium or potassium. The activation energy decreases with an increase in pH below 13.6 but increases with pH above 13.7.

These results suggest that the mechanism of this reaction is different on both sides of the pH range at which the N-shape variation takes place.