

molecules approaches that of liquid C_6H_6 ; on highly methoxylated and dehydroxylated adsorbing surfaces the C_6H_6 molecules approach gaseous state.

Electroconductivity and Adsorptivity of Gases on Semi-Conductors of Zinc Blende Structural Type

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Adsorption of oxygen and hydrogen gases was determined volumetrically, using the following isoelectric compounds: Ge, GaAs, ZnGe, CuBr. For each substance, the temperature of initial activated adsorption was found to be directly related to the corresponding range of unfavorable adsorption conditions. Electroconductivities of Ge, GaAs, and CuBr in hydrogen and oxygen were determined at various temperatures and pressures. Electroconductivity of each substance tested was found to depend upon its physical properties, and the contact time and pressure of each gas. Ideas are presented regarding the nature of chemisorptive bonding of the gaseous particles with the surface of the semi-conductors studied.

Relationship Between Catalytic and Electronic Properties of Semi-Conductors: Decomposition of Nitrous Oxide on Thin Copper Oxide Films

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Changes in the electron work function with reaction conditions were determined in decomposition of nitrous oxide on CuO films. At a room temperature the gas is adsorbed without decomposition. Adsorption of the gas on CuO films decreases the work function. The electron work function is at the minimum in the reaction over the films preheated in N_2O atmosphere to temperatures of 260°–280°. Initial decomposition of nitrous oxide occurs in this temperature interval.

The test-samples with relatively higher initial work function values have higher catalytic activity. Heating the more active catalyst samples in N_2O atmosphere produces greater change in the work function values than with the less active catalysts.

A mechanism is proposed for decomposition of nitrous oxide over copper oxide catalysts.

Hydrogenative Condensation of Olefins Over a Cobalt/Clay Catalyst in Presence of Oxygen as Reaction Initiator: Conversion of Butene-1

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In presence of oxygen as the reaction initiator, butene-1 condenses over a cobalt/clay catalyst to form liquid aliphatic hydrocarbons. For the reaction to proceed, hydrogen must be present. The greatest yields of liquid products are obtained at reaction temperatures of 100°–140° and initial butene-1/hydrogen ratios of 1.5/1.0. Concentration of the added oxygen in the optimum reaction mixture is 1–2 per cent.

The oxygen-initiated catalytic condensation of butene-1 apparently proceeds via a radical-chain mechanism, which closely parallels that of hydrogenative polymerization of this olefin over the same catalyst in presence of carbon monoxide as the initiator.

Infra-Red Spectroscopic Studies of Transformations of Isomeric Cresols Over a Ni/Al₂O₃ Catalyst

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A study was made of the infra-red spectra of cresol isomers chemisorbed on a Ni/Al₂O₃ catalyst. With m-cresol, physical adsorption of the molecules is observed. With o- and p-cresols, the material chemisorbed on the catalyst surface is a complex substance, indicating possible splitting of the aromatic rings by the catalyst.

Kinetics of Catalytic Dehydrogenation of Alcohols Over Germanium

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An investigation of catalytic dehydrogenation of ethyl and isopropyl alcohols was carried out, using samples of powdered germanium with different conductance and specific electroconductivity properties. The results show that compared

to the catalysts of electronic type, such as the germanium samples studied, the catalysts with site vacancies (holes) have about 10 kcal/mol smaller activation energy and about 3-4 times greater specific catalytic activity values.

A mechanism is proposed for the reaction studied. The effects of additives of the donor and acceptor types on catalytic activity of germanium are also discussed.

Chemisorption of Gases on Titanium Dioxide and on Its Solid Solutions in Tungsten Oxide with Different Electronic Properties

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Chemisorption of oxygen was studied on titanium dioxide and on its solid solutions in WO_3 with different activation energy, electroconductivity, and electron work function values. Addition of 0.5 mol % of WO_3 significantly alters the rate of oxygen adsorption on the TiO_2-WO_3 catalyst. It is believed that the active centers to chemisorb oxygen are the electrons captured at the surface acceptor-type levels, which could be formed by the vacant oxygen sites.

Structure and Method of Preparation of Fine Solid Dispersions of Metals for Spectral Studies

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A method is described for preparation of fine solid dispersions of silver, copper, gold, cobalt, and other metals. These dispersions are highly permeable to infra-red radiation. The structures of these dispersions were determined by electronic microscopy; the distributions in terms of the major dimension of the particles were determined statistically for the copper dispersions.

The results show that the dispersed particles of copper, silver, and gold are of spherical shape, with average particle diameters of 100, 250 and 80 Å, respectively. The results also show that the distribution curves are not symmetrical, the maximum point shifting in the direction of increasing particle size as the degree of polydispersion is increased.

BRIEF COMMUNICATIONS:

V. Ya. Volfson, L. N. Gan'yuk, E. F. Totzkaya: Catalytic Properties of Vanadium Bronzes.

E. I. Dosoveetzky, J. J. Yoffey: Kinetics of Oxidative Decarboxylation of Copper Benzoate.

S. A. Ven'yameenov, K. V. Topcheeyeva: Gas Chromatographic Studies of Adsorption of Acetylene and Vinyl Chloride on a Commercial Grade Alumina.

Yu. B. Kagan, A. Ya. Rosovsky, M. G. Sleenko, A. T. Ponamar'yenko: Investigation of Kinetics of Heterogeneous Catalytic Reactions in Terms of Their Ignition Points. Reactions of Arbitrary Order.

E. G. Bor'yeskova, V. I. Ligeen, K. V. Topcheeyeva: Infra-Red Spectroscopy in Investigation of Properties of Active Centers of Decationized Catalysts in Cumene Cracking Reactions.

LETTERS TO THE EDITOR:

Yu. D. Tzv'yetkov, O. V. Falad'yeyev: EPR Studies of Recombination of Stable Radicals, Using Irradiated Monocrystals of Organic Substances.

V. G. Veenogradova, B. N. Sheleemov, N. V. Fok: Stabilization of Atomic Hydrogen in Catalytic Decomposition of Hydrocarbons Over Silica Gel at 77°K in Presence of Photosensitized Benzene.

L. Yu. Rooseen, A. M. Chaikoen, A. E. Sheelov: EPR Spectra of Halide Atoms in Branched Chain Reactions in Gaseous Phase.