On Theory of Chemisorption

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A study was made of a linear model for chemisorption of atoms by solids. The indirect method to solve this problem was that of resolving the question of formation of a molecule from two atoms. A discussion is presented of the effect of the magnitudes of surface defects upon chemisorption.

Effect of the Overlap Integral Upon Spectrum Due to Local Electron Effects During Adsorption and During Contact of Two Crystals

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Simple models demonstrate that by taking into account the overlap integral between the adsorbent and the adsorbate one may demonstrate the appearance of local auxiliary electron effects. The same local effects could also originate upon contact of two crystals. Present an explanation of this phenomenon.

Chemisorption and Catalytic Properties of Semi-Conductive Films on Metals

By F. F. VOLKENSHTEIN, V. S. KOOZNIETZOV, AND V. B. SANDOMEERSKII

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A study was made of the effects of thickness of semi-conductive films covering metal surfaces and of the work function of the underlying metals upon adsorption, catalytic activity, and the work function of the films.

Effect of Redistribution of an Admixture at Near-Surface of a Volumetric Charge of a Semi-Conductor Upon Its Adsorption Capacity

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A study was made of the effect of redistribution during chemisorption of an admixture in the near-surface zone of a semi-conductor upon adsorption capacity of its catalytic surface. Show that redistribution of an admixture always results in an increase in adsorption capacity.

Effect of Acidity Upon Activity of Oxide Catalysts. Part II. Dehydration of Isopropyl Alcohol

By V. A. DZEESKO, M. S. BOREESOVA, N. S. KOTZARIENKO, AND E. V. KOOZNIETZOVA

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The rate of dehydration of isopropyl alcohol was determined over the following catalysts: silica-zirconia, silica-alumina, aluminum oxide, phosphoric acid on a silica gel base, calcium silicate, and silica gel. The investigation was carried out in a recycle-continuous unit at a temperature of 325°. The results show that dehydration rate of isopropyl alcohol increases with increasing acidity of the catalysts. Activity of the catalysts of the same nature is independent of the methods of their preparation.

Effect of Acidity Upon Activity of Oxide Catalysts. Part III. Dimerization of Propylene

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The effect of acidity on catalytic activity of various oxides was studied in dimerization of propylene. It was demonstrated that the surface area, number of acid centers, and activity per unit weight of catalyst undergo an orderly change depending upon the catalyst preparation method employed. The equivalent of catalytic activity of acidic centers remains constant for catalysts of the same chemical nature, regardless of the method of preparation and of the ratios of the components.

In the series, silica gel ($H_0 < +1.5$) to silica-zirconia ($H_0 < -8.2$), activity correlates with their acidity. For example, a three order of magnitude increase in acidity results in a ten-fold increase in activity.

Acidity has greater effect on the dimerization rate of propylene than of isobutylene.