tion coefficient, limiting concentration, and heat of adsorption of hydrogen on this metal. The results show that increasing the coverage with preadsorbed oxygen from 0 to $\sim 1.5 \times 10^{14}$ molecules/cm^2 decreases the initial value of the condensation coefficient by about 50%. Also, the limiting concentration of hydrogen decreases with increasing concentration of the preadsorbed oxygen. At the oxygen concentration of $\sim 1.6 \times 10^{14}$ molecules/cm^2, adsorption of hydrogen by tungsten at a room temperature practically ceases. Oxygen preadsorbed on tungsten surface also decreases the heat of hydrogen adsorption by this metal.

Determination of Heats of Hydrocarbon Adsorption on Aluminum Oxide by Gas Chromatography

By A. A. KOOBASOV, I. V. SMEERNOV, AND K. V. TOPCHEEYEVA

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The effect of desorption temperatures on the volumes of cyclohexane, cyclohexene, methyl cyclohexane, methyl cyclohexenes, toluene, and n-heptane retained by aluminum oxide was studied with the aid of gas adsorption chromatography. For the ring hydrocarbons, the retention volumes decrease with the type in the following order: aromatics, cycloolefins, cycloparaffins. The heats of adsorption were calculated using these temperature-volume retention data. The relatively small values of the heats of adsorption of cycloolefins are apparently the result of specificity of orientation of their molecules on the aluminum oxide surface. The greatest activity exhibited by cycloolefins on this adsorbent tends to substantiate the validity of these values.

Addition of methyl radical to cyclic hydrocarbons increases their retention volume and heat of adsorption characteristics.

Gas-Chromatographic Characterization Factors of Unit Surfaces of Adsorbents

By A. V. KEES'YEL'YOV, R. S. P'YETROVA, AND K. D. TSHCHERBAKOVA

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Using normal alkanes and silica gels of broad ranges of porosity, the authors develop a correlation between the relative values of specific retention volumes (cc/g of an adsorbent tested)—as determined experimentally by gas chromatography, *and* the absolute retention values (volume per unit of adsorbent surface) which are independent of the magnitude of specific surface of an adsorbent. These absolute values are physicochemical constants which define the nature of any adsorbate-adsorbent system. The absolute retention volumes so evaluated, facilitate rapid determination by gas chromatography of specific surfaces of silica gels with wide ranges of pore sizes.

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.

Catalysts for Complete Oxidation of Hydrocarbons

By NAOYUKI TODO, TOSHIO SATO, AND MINORU YANAGI

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In order to select a suitable oxidation catalyst for automotive exhausts, the ability of a variety of catalysts under the wide range of conditions encountered with exhaust systems has been investigated. The mixtures of Mn_2O_3 and Fe_2O_3, with a weight ratio of 40-20 to 60-80, are active at lower temperatures and have marked resistance to poisoning by lead compounds. The loss in the activity by heat treatment of catalysts at 700°C for 3 hours are the least of investigated catalysts.

The effect of Fe_2O_3 as an additive to Mn_2O_3 is to protect the crystal growth of catalysts by the formation of substituted solid solution.

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