CHEMISTRY ON FLUORINATED SURFACES. BRØNSTED AND LEWIS ACID SITES

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The fluorination of high surface area metal oxides is an important step in the production of heterogeneous catalysts for halogen exchange, e.g. fluorinated γ-alumina or silica. Two situations have been encountered experimentally when the defect spinel γ-alumina is fluorinated at room temperature using a variety of volatile inorganic fluorides : (i) formation of new Brønsted acid surface sites, or (ii) formation of new Brønsted and Lewis sites. Models for both types of behaviour have been developed from an idealised γ-alumina surface by combining the results obtained from several experimental methods. I.r. spectroscopy and [^{18}F]-labelling were used to follow the course and extent of the gas-solid reactions, to obtain kinetic data and to determine the lability of surface fluoride. Adsorption-desorption phenomena were studied using [^{14}C]- and [^{35}S]-labelled molecules and reactions involving but-1-ene or CH_3CCl_3 were used to probe Brønsted and Lewis acid character respectively.

Polymerization of a C_2 chloroolefin in the presence of Lewis acid promoted, fluorinated γ-alumina leads to the formation of an organic layer on the surface. The nature of these surfaces, which are also catalytically active, will be discussed in the light of ^{1}H, ^{13}C and ^{27}Al solid state MAS n.m.r. measurements.

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