

Journal of Physical Chemistry C 2015 vol.119 N49, pages 27410-27415

Quantitative Analysis of Lewis Acid Centers of γ -Alumina by Using EPR of the Adsorbed Anthraquinone as a Probe Molecule: Comparison with the Pyridine, Carbon Monoxide IR, and TPD of Ammonia

Gafurov M., Mukhambetov I., Yavkin B., Mamin G., Lamberov A., Orlinskii S.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2015 American Chemical Society. Quantitative electron paramagnetic resonance (EPR) measurements were done on the alumina oxide surface by using 9,10-anthraquinone probe (AQ) with the AQ amount in the range of (0.5-20) wt %. The nature of three paramagnetic centers observed simultaneously is ascribed to the strong, medium, and weak Al Lewis acid sites on the basis of combined EPR study/infrared (IR) spectroscopy of the adsorbed CO and pyridine/temperature-programmed desorption (TPD) of ammonia. It is shown how the optimal concentration of AQ probe molecule for the exhaustive quantitative examination of alumina surface can be determined directly from EPR. A possibility to characterize the surface distribution of Lewis acid centers by AQ molecules is discussed.

<http://dx.doi.org/10.1021/acs.jpcc.5b09759>
