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SPECIFIC SURFACE AREA FROM NITROGEN ADSORPTION DATA AT 77 K USING THE ZETA ADSORPTION ISOTHERM

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The determination of the specific surface area (SSA) of solid powders has been a long standing problem in surface science. We use the zeta adsorption isotherm (ZAI) and propose a method for determining the SSA of powders using the N_2 adsorption measurements at 77K. The consistency of the results obtained is demonstrated using two α-alumina samples that have different total surface areas. When the proposed method is applied to convert the amount adsorbed per unit mass to the amount adsorbed per unit area, we show that there is no measurable difference between their adsorption isotherms. Also, we show the proposed method can be applied to six different powders having a variation in their specific surface areas of two orders of magnitude. The corresponding error can be obtained from a single equilibrium adsorption measurement and maximum standard deviation in the mean value of the SSA among six cases is less than 7%.

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