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Carbon blacks, because of their lack of porosity, have been studied extensively by the method of adsorption from solution. Independent assessments of surface area (electron microscopy) enable extents of adsorption to be related to surface coverage. Porous carbons, comparatively, have received little attention, one reason being the difficulty of characterising the porous structure. To characterise the carbons of this study by adsorption from the gas phase, use has been made of the Dubinin theory of pore-filling, which distinguishes between micropore filling and coverage and filling of transitional pores. The unsuitability, in the use of the BET equation to obtain surface area values, is thus avoided. Gas phase adsorptions were made using nitrogen (77°K) and carbon dioxide (195° and 273°K). Carbons were prepared from carbonised polyvinylidene chloride (850°C) by activation with CO_2 up to 85% burn-off. It has been found that adsorption of iodine from aqueous I_2/KI solution is very similar to adsorption of nitrogen at 77°K and carbon dioxide at 195°K . Complete pore filling by iodine occurs in the activated carbons and it is suggested that multilayer formation can occur with carbon blacks. Hence the iodine isotherms of activated carbons (as do the nitrogen isotherms) predict values of surface area which are unrealistically high. For example, polyvinylidene chloride carbons, activated to 70% and 85% have estimated surface areas of over $3000\text{ m}^2\text{g}^{-1}$ taking the area of coverage of an iodine molecule as 40\AA^2 . The correct isotherm to represent iodine adsorption uses the concentration of free iodine in solution and not total iodine concentration. This implies that control of the iodide concentration must be exercised. For the more activated carbons the experimental isotherm is a function of iodide concentration when total iodine ($\text{I}_2 + \text{I}_3^-$) concentration is plotted as the equilibrium concentration. Monolayer and multilayer adsorption is by iodine molecules only. Using ^{131}I , no adsorption of I^- or I_3^- could be detected at high coverage. Chemisorption of iodine occurs to a limited extent and does not invalidate the above conclusions.