

WETTING AND ADSORPTION FUNDAMENTALS

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ABSTRACT: The presence of an "adsorbed" film adjacent to

recognized for many years as an important element in the balance of molecular, gravity and capillary forces leading to the definition of the static contact angle. Recently, the role of the adsorption film in determining intrinsic hysteresis effects during measurement of static contact angles has been recognized and evaluated. For many years also, scientists searched for a quantitative relationship between adsorption isotherms leading to the formation of the adsorbed film and the theoretical prediction of wetting phenomena. The key to understand these effects is the recognition that, regardless of the direction of gravity, molecular and capillary effects determine the shape of the three-phase contact line region within molecular-level distances. In this presentation we will present new theoretical developments connecting existing experimental data on adsorption isotherms and contact angles. Once the connection between liquid on solid adsorption and contact angles is established, we can explain some of the most puzzling and unexplained experimental results on temperature dependency of static contact angles and highlight a plausible mechanism for wetting transitions and related phenomena. We will show why, for example, dampening of paper lowers apparent contact angle during printing. In all coating applications the presence of an adsorbed film on the solid surface, having a qualitative effect on contact angles, can be the key to solid pre-coating treatment. (1) Departamento de Ing. Quimica y Textil, Universidad de Salamanca (2) Physics and Astronomy Department, University of Leeds, Leeds, UK.