

Adsorption Enthalpy: A Measure of Molecular Stickiness

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The adsorption enthalpy (ΔH_{ads}) describes the adhesion strength of a molecule on a surface. Information about adsorption enthalpies is valuable in diverse areas such as predicting the fate of environmental pollutants, designing detectors, and determining the effectiveness of odorants. Gas-solid chromatography is a broadly applicable method for determining adsorption enthalpies. Typically, a packed column is prepared with the adsorbent of choice. Then the specific retention volume for a compound is measured as a function of temperature. From these data one calculates the adsorption enthalpy. Measurements are made at low surface coverage to approximate infinite dilution conditions. To illustrate the technique, we will present data for the adsorption enthalpies of several hydrocarbons on concrete. For these measurements we made a packed column from 60-80 mesh concrete, which was obtained by passing milled concrete through a set of standard sieves. Our work with concrete is part of a larger project to study the surface energetics of a variety of chemicals on construction materials.