Surface Properties of Fluorinated and Semifluorinated Alkanes

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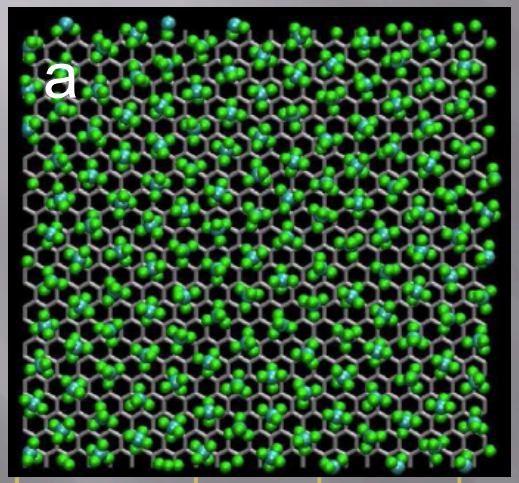
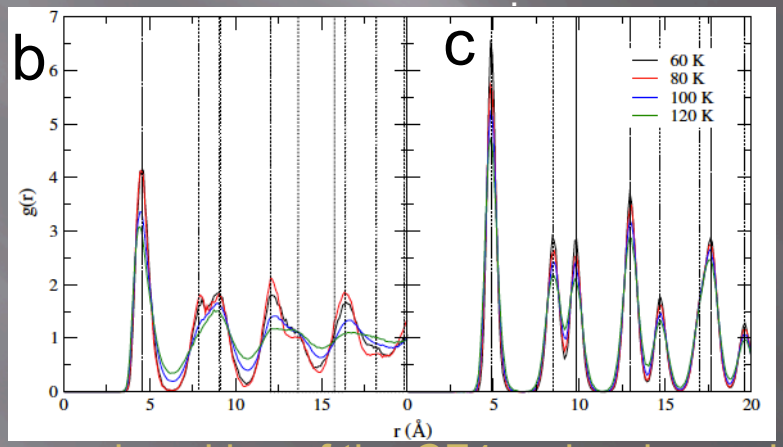
Our recent focus was on the structure and dynamics of trifluoromethane (CF_4) Multilayer films on Graphite and Hydroxylated α-quartz surfaces

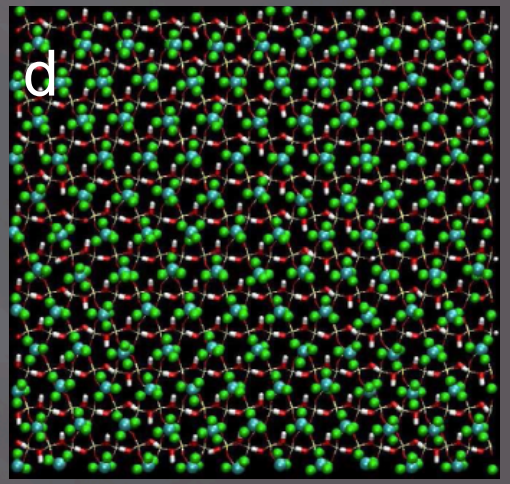
Understanding the mechanics of physisorption is a central concern of materials science, especially when it comes to understanding the behavior of adsorbates at the surface of the substrate and in the region close to the substrate.

CF_4 on Graphite: Figure (a) below shows the first layer of the CF4 film and the top layer of the graphite substrate. Figure (b) shows the corresponding 2-D radial distribution function of the first layer, g(r).

CF_4 on Hydroxylated α-quartz: Figure (d) below shows the first layer of the CF4 film and the top layer of the α-quartz substrate. Figure (c) shows the corresponding 2-D radial distribution function, g(r).







In general, we observe hexagonal packing of the CF4 molecules on both graphite and silica Surfaces. However, on α-quartz, hydrogen-bonded hydroxyl groups arranged in a zig-zag pattern creates a set of hexagonal domains that permit CF4 adsorption only within the domains.

Our next goal will be to extend the investigation to halomethanes, to understand how the polar nature of the adsorbate molecules would play important roles in determining both the structure and dynamics of surface layers