

Thermodynamics of adsorption and properties of simple fluids on solid surfaces modified by layers of grafted chains. Recent advances from density functional approaches

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Recent experimental research in new materials, processes and devices involving fluids on chemically modified solid surfaces motivated us to extend theoretical modelling and versatility of density functional approaches and investigate this class of systems. Specifically, we are interested in phenomena occurring at liquid-solid interfaces under the conditions that a solid is covered by a layer of chain molecules (polymers) that are grafted by terminating segments. This setup provides the possibility to influence intentionally the properties of the interface as well as to observe some new surface phenomena. The principal issue of the theory is in appropriate modelling of the grand thermodynamic potential of the systems in question. The effects of connectivity of segments that form chains, all non-bonding interactions between fluid species and fluid-solid interactions are taken into account. An ample set of results published during last few years in the *Journal of Chemical Physics* and *Journal of Physical Chemistry* is reviewed in detail.