Complex Solid-Liquid Intefaces at the Nanoscale

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In this talk, I will highlight the role of surface structure in solid-liquid intefaces. In particular I will show how an alternation of different domains (mostly hydrophobic and hydrophilic) at a length scale that is molecular is responsible for a structural component of the interfacial energy that was overlooked to date. Various substrates will be described where this coexistance is characterized either by scanning probe microscopy or by small angle neutron scattering or both. In all cases the interfacial energy will be determined by classical methods (contact angle, pendant drop, etc.) or by a newly developed methods based on small amplitude atomic force microscopy. The main conclusion of this presentation will be that there exist a structural component to the interfacial energy, and that such component can be responsible for a large fraction of the total wetting of a substrate. Such component is due to the geometrical constraints that the solid imposes on the liquid.