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Understanding the intrinsic water wettability of graphite and MoS_2 ANDREW KOZBIAL, ZHITING LI, HAITAO LIU, LEI LI, Univ of Pittsburgh, DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING COLLABORATION, DEPARTMENT OF CHEMISTRY COLLABORATION —
Wetting behaviour of 2D materials is important for understanding fundamental surface properties along with practical use in application. Changes in wetting can negatively impact device performance because surface properties of 2D materials are strongly dependent on adhesive forces between the constituent materials and its interaction with water. Graphene and 2D transition metal dichalcogenides (TMDCs) are interesting candidates for ultrasensitive electronic and optoelectronic devices. The atomic thinness of 2D materials makes them particularly sensitive to slight changes in the surround environment. We have reported on the wetting of HOPG and graphene, showing that water contact angle (WCA) is strongly dependent on hydrocarbon contamination. Experimental evidence indicates that the clean, mildly-hydrophilic surface adsorbs airborne hydrocarbons resulting in the traditionally observed hydrophobicity. This effect has been extended to MoS_2 (a TMDC) and can potentially be responsible for apparent hydrophobicity of many other materials. This talk will provide background on our results, their applicability in practical application, and our recent research results towards understanding the true, intrinsic WCA of 2D materials.

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