

Surface Wettability Control for Energy Saving and Restoration

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The wettability of bulk material surfaces is of great importance in chemical, biological, and materials related modern science, engineering and technology, because it has large impact on other related physicochemical properties, such as adhesion, lubrication, catalysis, and friction. Learning from bio-surface structures in nature, surface chemistry and topography have been regarded to play central roles in controlling the interfacial wettability. Biomimetic has enabled people to design various interfacial materials with special properties. One of the most important application areas of interfacial materials is fuel transportation. Because of the high viscosity of crude oil, pipeline transportation of petroleum usually costs a lot of energy. Recently, we are focusing on designing a water lubricated surface through controlling surface wettability in order to reduce energy consumption during oil transport. Moreover, considering oil spill is also a big problem for petroleum exploitation and waterborne transportation, which is not only a serious energy loss but also causes water contamination, we fabricated a gravity-driven water/oil separation membrane for restoring oil from the polluted water.