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Multifunctional polymer nano-composite based superhydrophobic surface[1] TANMOY MAITRA, ASHISH ASTHANA, Laboratory of Thermodynamics in Emerging Technologies, Department of Mechanical and Process Engineering, ETH Zurich, ROBERT BUCHEL, Particle Technology Laboratory, Department of Mechanical and Process Engineering, ETH Zurich, MANISH K. TIWARI, Mechanical Engineering, University College London, DIMOS POULIKAKOS, Laboratory of Thermodynamics in Emerging Technologies, Department of Mechanical and Process Engineering, ETH Zurich — Superhydrophobic surfaces become desirable in plethora of applications in engineering fields, automobile industry, construction industries to name a few. Typical fabrication of superhydrophobic surface consists of two steps: first is to create rough morphology on the substrate of interest, followed by coating of low energy molecules. However, typical exception of the above fabrication technique would be direct coating of functional polymer nanocomposites on substrate where superhydrophobicity is needed. Also in this case, the use of different nanoparticles in the polymer matrix can be exploited to impart multi-functional properties to the superhydrophobic coatings. Herein, different carbon nanoparticles like graphene nanoplatelets (GNP), carbon nanotubes (CNT) and carbon black (CB) are used in fluropolymer matrix to prepare superhydrophobic coatings. The multifunctional properties of coatings are enhanced by combining two different carbon fillers in the matrix. The aforementioned superhydrophobic coatings have shown high electrical conductivity and excellent droplet meniscus impalement resistance. Simultaneous superhydrophobic and oleophillic character of the above coating is used to separate mineral oil and water through filtration of their mixture.

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Tanmoy Maitra
Laboratory of Thermodynamics in Emerging Technologies,
Department of Mechanical and Process Engineering, ETH Zurich

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