One-step fabrication of stable superhydrophobic poly(tetrafluoroethylene) surfaces by direct \(\text{CF}_4\) treatment using the gas discharge ion source

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Stable superhydrophobic poly(tetrafluoroethylene) (PTFE) surfaces were fabricated by direct \(\text{CF}_4\) treatment using the gas discharge ion source. The samples were evaluated using contact angle, surface morphology, and surface chemistry characterizations. Superhydrophobic behavior with contact angles as high as 156° were observed. The wettability of all the treated samples was found to be stable in time as evidenced by the statistically insignificant differences in the hysteresis contact angles. The superhydrophobicity of the modified PTFE was due to (1) the formation of carbon nanoparticles in the surface, and (2) the changes in the surface chemistry.

The superhydrophobic PTFE showing the carbon nanoparticles in the surface.