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Robust superhydrophobic PDMS/camphor based composite coatings with self-cleaning and self-healing properties SUSHANTA MITRA, BICHITRA SAHOO, SONIL NANDA, JANUSZ KOZINSKI, York University — We report a novel process for the preparation of self-cleaning polymer composite with self-healing ability to self-repair from chemical and mechanical damages using readily available materials like Polydimethylsiloxane (PDMS) and camphor soot particles. When the camphor soot particles loading attained a critical level, the composite coating on glass and stainless steel surfaces reveals self-cleaning property with water contact angle of 171^0. We also demonstrate that any degradation of its surface energy under the oxygen plasma etching can be recuperated, illustrating that the obtained superhydrophobic surface has a good self-healing ability. The fabricated PDMS/Camphor soot hybrid coating exhibited excellent retention of superhydrophobicity against impact of sand particles from a height of 10-70 cm. In addition, after being damaged chemically by strong acid treatment (2M HNO_3 solution), the coating can also restore its properties after a short thermal cycle. Such versatile superhydrophobic surfaces can have wide applications ranging from under-water marine vessels to coating for surfaces to protect them from moisture and unwanted penetration of water.

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