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Fabrication of a bulk superhydrophobic conductive material by mechanical abrasion

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Abstract

10 A Ketjen black (KB)-vapour-grown carbon fibre (VGCF)/polypropylene (PP) bulk superhydrophobic conductive material was prepared by processing the mixture with a range of roughnesses of abrasive paper. The difference in abrasion resistance between fillers and resin induces surface roughness during abrasion. SEM images showed hierarchically structured roughness that consists of heaves with fillers. The influence of the loading and 15 ratio of the fillers was investigated. When the loading of the fillers was 33.3 wt% and the ratio of KB to VGCF was 4:1, the surface showed a static water contact angle of approximately 167.5°, a sliding angle below 1°, and a volume resistivity of approximately 0.8 Ω -cm. The superhydrophobicity of the material was stable over a wide range of pH, temperature and appropriate mechanical abrasion. The bulk material is environmentally 20 friendly, easy to scale up for large-scale applications and may be useful for anti-icing applications or self-cleaning.

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