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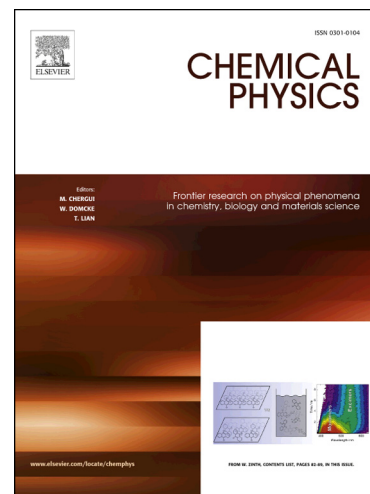
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Ternary graphene/amorphous carbon/nickel nanocomposite film for outstanding superhydrophobicity

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Abstract: A novel superhydrophobic ternary graphene/amorphous carbon/nickel (G-Ni/a-C:H) carbon-based film was fabricated by a green approach of high-voltage electrochemical deposition without using aqueous solution, which was systematically investigated including the structure and relating applications on self-cleaning and corrosion resistance. Graphene and nickel nano-particle inserts were effective to tailor the feature of nanocrystallite/amorphous microstructure as well as micro-nanoscale hierarchical rose-petal-like surface for G-Ni/a-C:H carbon-based film. Surprisingly, this deposit could present outstanding superhydrophobicity with the contact angle of 158.98 deg and sliding angle of 2.75 deg without any further surface modification meanwhile it could possess fairly well adhesion. Furthermore, the superhydrophobic G-Ni/a-C:H carbon-based film could exhibit excellent corrosion resistance and self-cleaning performances compared to no graphene incorporated deposit. The procedure of fabricating deposit might be simple, scalable, and environmental friendly, indicating a promising prospect for industrial applications in the field of anti-fouling, anti-corrosion and drag resistance.

Keywords: G-Ni/a-C:H film; Superhydrophobic; Nanocomposite; Corrosion resistance; Self-cleaning

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