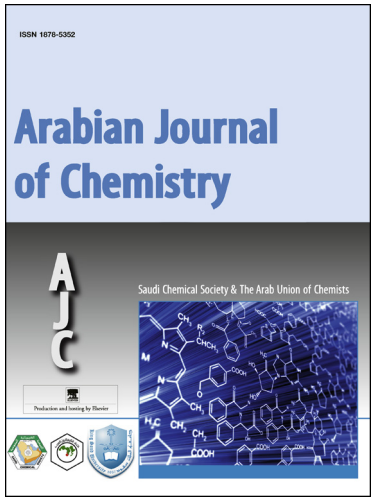

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Improved Adhesion of Superhydrophobic layer on metal Surfaces via One Step Spraying Method

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Abstract

Superhydrophobic metal substrates have been fabricated by a simple spraying method. The processes of decreasing surface free energy and increasing surface roughness have been accomplished in one step via the adding of functionalized silica (silica nano particles with octyltriethoxysilane) to adhesive polymer. The method is simple, cost-effective and can be applied on the large industrial scale. Scanning electron microscopy (SEM) was used for surface morphology analysis, showing the roughness produced by surface treatment. The wettability of the micro-nano silica film varied from hydrophilicity (water contact angle 88^o) to superhydrophobicity (water contact angle 156.9^o), while sliding contact angles dramatically decreased ($< 5^o$) by adding Functionalized silica and/ or adhesive polymer. Roughness increased with silica increment which improves the wettability. The coatings were electrochemically characterized by electrochemical impedance spectroscopy (EIS) and Tafel polarization curves; it was found that both systems had good performance against corrosion in 3.5 % sodium chloride solution. Furthermore, the stability of the coated layer on copper substrate was investigated.

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