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Waterborne, all-polymeric, colloidal 'raspberry' particles with controllable hydrophobicity and water droplet adhesion properties

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ABSTRACT

We present a superhydrophobic coating made from waterborne, all-polymeric 'raspberry' particles, composed of a micrometric spherical core decorated with a corona of nanometric spherical particles. As-cast particles produced hydrophobic coatings that were highly adhesive to almost-spherical droplets of water, resembling the properties of some types of rose petals. The coatings could be made slippery to spherical water droplets, like the lotus leaf, by surface activation with air plasma followed by reaction with an alkyl-trichlorosilane. The silanisation of films of latex particles was investigated on two model surfaces (a flat polystyrene film and a monolayer of polystyrene waterborne microparticles) by X-ray photoelectron spectroscopy and water contact angle measurements, and applied to our recently-developed 'raspberry' particles to produce a superhydrophobic coating.

KEYWORDS

Superhydrophobicity; 'raspberry' particles; silanisation.