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# A facile approach to develop modified nano-silica embedded polystyrene based transparent superhydrophobic coating

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## ABSTRACT

Triethoxyoctylsilane modified nano-silica (TOS-SiO<sub>2</sub>) embedded polystyrene (PS) based transparent superhydrophobic coating (SHC) has been synthesized on a glass substrate via a facile sol-gel method. A dip-pulling process was employed to synthesize the coating. The morphology of the PS/TOS-SiO<sub>2</sub> coating revealed V-shape dyads like porous structure. The static water contact angle (CA) of  $162 \pm 2^\circ$  with a sliding angle (SA) of  $3 \pm 1^\circ$  was obtained for the synthesized coating. The thin coating showed a high average transmittance of  $91.8 \pm 0.5\%$  close to the average transmittance of bare glass ( $92.6 \pm 0.2\%$ ). An appropriate amount of TOS-SiO<sub>2</sub> embedded PS with unique morphology and average roughness of  $65.39 \pm 6.7$  nm provided a transparent SHC. The transparency and roughness of the SHC were optimized by controlling the dip/pull speed and time. The developed transparent SHC can be utilized for self-cleaning application of the cover glass of solar panels.

**Keywords:** Nanoparticles; Sol-gel preparation; Triethoxyoctylsilane; Polystyrene; Transparent coating; Superhydrophobic coating.

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