Title : PM 2.5 dust adsorption efficiency of coatings on different substrates prepared by spray coating technique

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ABSTRACT

This study investigates the PM2.5 dust adsorption efficiency of coatings applied to different substrates using a spray coating technique. The experiment was conducted with two types of triboelectric coatings: negative-charge coatings, consisting of trichloro(1H,1H,2H,2H-perfluorooctyl)silane (PFOTCS), polystyrene (PS), and polyvinylidene fluoride (PVDF); and positive-charge coatings, composed of polyvinyl alcohol (PVA), titanium dioxide (TiO_2), and aluminum oxide (Al_2O_3). Colloidal or mixture solutions were prepared at a concentration of 3% w/v or v/v in deionized water or toluene, respectively. These solutions were stirred for 1 hour at atmospheric pressure and room temperature before being applied to different substrate types, including acrylic, wood, and mirror glass, using a spray coating technique. The physical, structural, and wetting properties of the coatings were characterized using scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), and water contact angle (WCA) measurements. The effects of

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different coating and substrate types on morphology, wetting behavior, and PM2.5 adsorption capability were evaluated, compared, and discussed. The findings of this study contribute to the potential application of these coatings on various substrate types in future developments.

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