



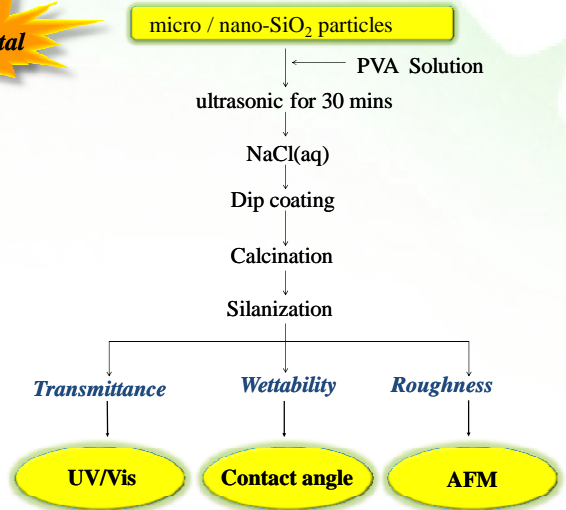
Fabrication of Transparent and Superhydrophobic Surfaces by Dip-Coating Method

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Abstract

- Transparent and superhydrophobic surfaces were fabricated from an SiO₂ nanoparticles /polyvinyl alcohol (PVA) hybrid colloidal solution.
 - using a rapid dip-coating process
- Thin films had an antireflective effect with a transmittance higher than that of plain glass in the visible light region.
 - at PVA concentrations of 5 wt% and 8 wt%
- Transparent and superhydrophobic surfaces with an average transmittance of 94 %, and a static contact angle above 148° after modifying the fabricated surface with a monolayer of hydrophobic silane.
 - at a PVA concentration of 5 %

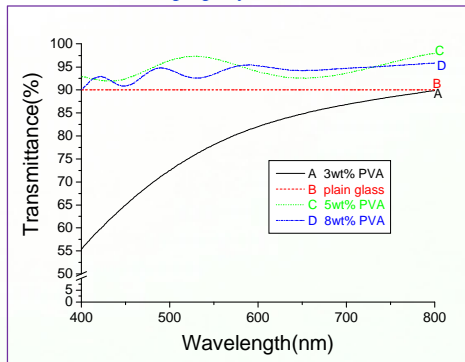
Experimental



Results

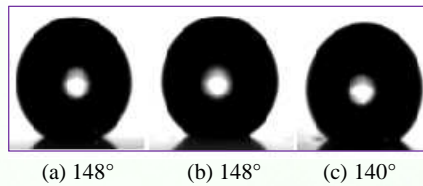
◆ Transmittance spectra

- PVA concentrations of 5 wt% and 8 wt% with antireflective property

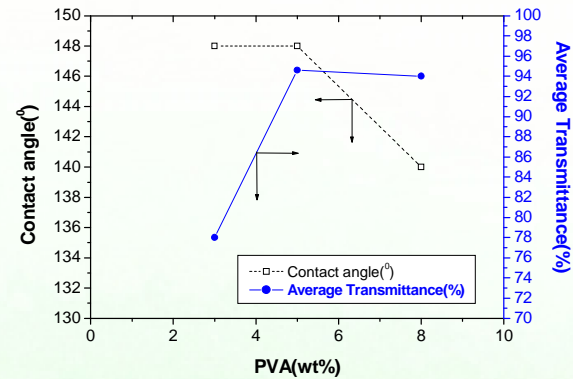


◆ The water droplet static contact angle

- (a) 3 wt.% PVA (b) 5 wt.% PVA and (c) 8 wt.% PVA

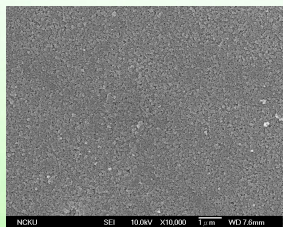


◆ Different PVA hybrid solution concentrations

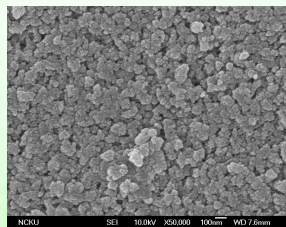


◆ SEM micrographs

- The morphology of the particulate film was flat and uniform
- The hierarchical structure of film with micropores



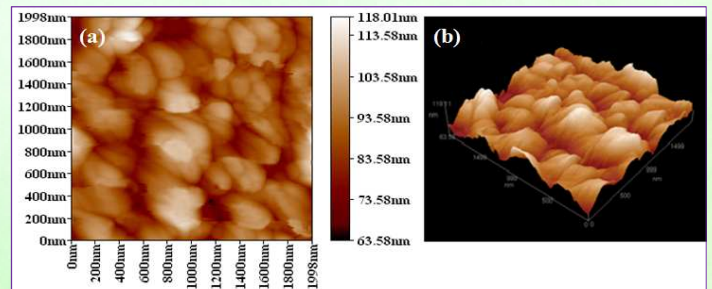
(a) 10k



(b) 50k

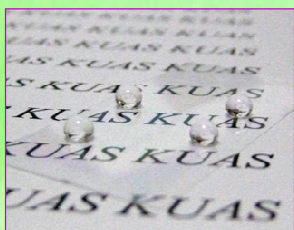
◆ Atomic force microscopy images

- The RMS roughness was 8.16 nm (5wt% PVA)

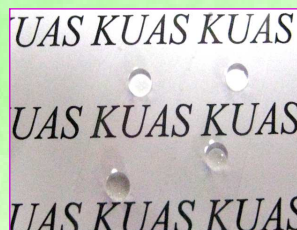


◆ Transparent and superhydrophobic surface

- Contact angle of 148° and an average transmittance of 94.6 %



(a)



(b)

Conclusion

We demonstrated that superhydrophobic and transparent surfaces could be fabricated with SiO₂ nanoparticles/PVA (Polyvinyl Alcohol) hybrid colloidal solution by using fast dip-coating process. By increasing the PVA concentration, the water static contact angle and average transmittance of thin films can be elevated. Thin films reveal antireflective property at the PVA concentrations of 5wt% and 8wt%. Moreover, superhydrophobic and transparent surface with water static contact angle of 148° and average transmittance of 94.6% was achieved at the PVA concentration of 5wt%.