PREPARATION OF SUPER-HYDROPHOBIC FILM BY FLUORINE-POLYMER
ABSTRACTS

K. C. Chang, 1 H. Chen, 1*, C. K. Huang 1 and Shi-Ing Huang 1, 2

1 Department of Chemical and material engineering, National Central University, No.300, Jhongda Rd., Jhongli City, Taoyuan County 320, Taiwan, R.O.C.
2 Material and Chemical Research Laboratories, Industrial Technology Research Institute, Chutung, Hsinchu 31015, Taiwan, R.O.C.

Preparation of organic superhydrophobic films by utilizing TA-N Fluoroalkylate (TAN) and methyl methacrylate (MMA) copolymer as water-repellent materials and the inorganic silica powders as the surface roughness has been developed. Coating solutions were prepared by one-step method, adding the silica powders into copolymer solution, and two-step method, adding silica powders in monomers then reacted, respectively. It is easy to obtain superhydrophobic film by spin-coating the coating solution onto substrates. The properties of the film were characterized by atomic force microscope (AFM), scanning electron microscopy (SEM), contact angle measurement, and UV-VIS scanning spectrophotometer.

The result showed that the contact angle of the film prepared by one-step method (37.6 wt % of silica powder in the coating solution) was greater than 150˚, but the transmittance of visible light of that is only 30%. On the other hand, the contact angle of the films prepared by two-step method (20 wt % of silica powder in the coating solution) was higher than 160˚ and the transmittance of visible light of that was greater than 90%.

The equation of Wenzel’s model was also proved by hydrophobic (TAN) and hydrophilic (poly (octyl acrylate), POA) materials, respectively. Thus the superhydrophobic and superhydrophilic films were able to be obtained by introducing a roughness on a hydrophobic surface and a hydrophilic surface, respectively.

References

*Corresponding author, Phone: +886-3-4227151Ext34216, E-mail: huichen@cc.ncu.edu.tw