

Effect of solution treatment with various solvent ratios on the hydrophobicity of polystyrene surface

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In this study, we used a mixture of good and poor solvents for polystyrene (PS) in order to control surface hydrophobicity of PS plate after solution treatment of its surface with various mixtures. Tetrahydrofuran(THF), allylamine, benzene and toluene were used as good solvents and ethanol was used as a bad solvent. How molecular interaction between each mixture and PS can affect the change of surface hydrophobicity of PS plate and what mixing ratio of good/poor solvents can generate a maximum hydrophobicity at each mixture were carefully investigated through measuring contact angle and weight loss of final PS plate. The surface of PS was also characterized by ESCA, ATR FT-IR, SEM, and AFM. As a result of this experiment, the water contact angle of PS plate increased approximately up to 45° after solution treatment of PS surface but the chemical composition of PS surface did not show any significant changes. Thus, the change of surface morphology can cause the change of surface hydrophobicity of PS plate. This study can provide a simple and economic method for fabricating PS surface with controlled hydrophobicity.