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Van-Tien Bui, Ho-Suk Choi

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# Surface Morphology and Wettability Control of Polymer Substrates: A Comparison of Water-Miscible and Water-Immiscible Mixture Solvents

*Van-Tien Bui<sup>a,b</sup> and Ho-Suk Choi<sup>\*b</sup>*

<sup>a</sup> Institute of Research and Development, Duy Tan University, Da Nang, Viet Nam

<sup>b</sup> Department of Chemical Engineering, Chungnam National University, 220 Gung-Dong, Yuseong-Gu, Daejeon 305-764, Republic of Korea.

KEYWORDS: Surface morphology control; wetting property; honeycomb substrate; solvent/nonsolvent; phase separation; dip-coating

## ABSTRACT

In this work, control of the surface morphology and the wettability of polymer substrates is demonstrated using a simple one-step process. The approach is based on combining the nonsolvent-induced phase separation and a scalable dip-coating technique. Two types of solvent/nonsolvent systems, i.e. water-immiscible and water-miscible mixtures, are used to not only induce an outermost ternary solution but also produce and control the porous structure on the substrate surface through the phase separation and self-assembly of the nonsolvent-rich templating droplets. The effects of the solvent systems and their compositions on the surface features, cross-sectional morphology, and wettability are systematically investigated and compared. Furthermore, a potential mechanism for the formation of a ternary solution resulting

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