

### Ultra-large-scale fabrication of highly ordered structure honeycomb patterns via solvent/non-solvent coating method

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Highly ordered hexagonal patterns of commercial bio-compatible poly(lactic acid) (PLA) were successfully fabricated through simple dipping process. The chloroform and methanol were used as a solvent/non-solvent pair which exhibit great potential to acquire regular pores and also high sensitivity to control surface morphologies. The wetting property, one of the most important aspects in practical applications, was carefully characterized. The results showed the variation in a wide range from hydrophilicity of an as-prepared smooth film to the high hydrophobicity of porous films. Furthermore, we also suggest a possible mechanism in which non-solvent-induced phase-separation and water absorbed from air assist in growing and stabilizing the polymer-lean phase that gives rise to the honeycomb-patterned films. Considering the wide use of such highly ordered patterns as well as the excellent bio-compatibility and bio-degradability of PLA polymers, these highly-ordered, honeycomb-patterned PLA-polymer film, are expected to potential applications in many fields such as bio-technology, photonic and electronic devices.