

### Structural Self-assembly of hydrogen-bonded poly(vinyl chloride-g-4-vinyl pyridine) graft copolymers

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An amphiphilic graft copolymer of poly(vinyl chloride-graft-4-vinyl pyridine), i.e., PVC-g-P4VP was synthesized via atom transfer radical polymerization (ATRP) and modified by introducing 1,5-dihydroxynaphthalene (DHN) as a hydrogen bonding donor to form hydrogen-bonded macromolecules. The PVC-g-P4VP graft copolymer prepared from a selective solvent for PVC, i.e., tetrahydrofuran (THF) exhibited a well-organized micellar morphology consisting of a P4VP core and a PVC corona. However, the graft copolymer prepared from a good solvent for both domains, i.e., N,N-dimethylformamide (DMF) showed a less-organized, random microphase-separated morphology. Upon the introduction of DHN, a more spherical morphology and a more-organized 'bicontinuous-like' morphology was observed in THF and DMF, respectively. This results from strong segregation between the two domains due to the enhanced interfacial energy by DHN. When DHN was removed by methanol, nanoporous films with versatile pore sizes and shapes were generated.