11. The method of any one of claims 1-10, wherein the solvent system includes a solvent or a mixture of solvents selected from halogenated hydrocarbons, ethers, amides, and sulfoxides.

12. The method of any one of claims 1-11, wherein the solvent system includes a solvent or a mixture of solvents selected from dichloromethane, 1-chloropentane, 1,1-dichloroethane, dimethylformamide, dimethylacetamide, N-methylpyrrolidone, dimethylsulfoxide, tetrahydrofuran, 1,3-dioxane, and 1,4-dioxane.

13. The method of any one of claims 1-12, wherein the polymer solution contains about 0.1 to about 2% by weight of the diblock copolymer.

14. The method of any one of claims 1-13, wherein the substrate is selected from glass, silicon wafer, metal plate, plastic film, and a plastic film coated on a glass surface or on a silicon wafer.

15. The method of any one of claims 1-14, wherein the substrate is porous.

16. The method of any one of claims 1-15, wherein the annealing is carried out in the presence of a solvent vapor.

17. The method of any one of claims 1-16, wherein the diblock copolymer in the self-assembled structure has a cylindrical morphology perpendicular to the plane of the self-assembled structure and the self-assembled structure has pores whose diameters are in the range of about 40 to 60 nm and pores extend all the way down to its thickness and to a depth of about 50 nm.