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**“Cooperative” Secondary Relaxation Induced High Room-Temperature Dielectric Constant in Supramolecular Diblock Copolymer Assembly** WEI CHEN, JIA-YU WANG, THOMAS RUSSELL, University of Massachusetts, Amherst — The development of high-dielectric-constant polymers as active materials in high-performance devices is one of challenges in polymer-based electric system like flexible high-energy-density capacitors and organic thin-film transistors. Here, we incorporated homochiral (1S)-(+)-10-camphorsulfonic acid (CSA) and non-linear optical Disperse Yellow 7 (DY7) into poly(2-vinylpyridine)-block-poly(methyl methacrylate) (P2VP-b-PMMA) copolymers via both ionic interactions and hydrogen bonding, forming a supramolecular assembly with cylindrical nanostructures. In contrast to the P2VP homopolymer assembly with a dielectric constant less than 10 at room temperature, supramolecular diblock copolymer assembly exhibits a temperature- and frequency-independent dielectric constant close to 50 at frequencies lower than 100 Hz. This is comparable with that of ferroelectric poly(vinylidene fluoride-trifluoroethylene-chlorofluoroethylene) (PVDF-TrFE-CFE) terpolymer (40∼60) and larger than those of PVDF (∼10) and PVDF-TrFE (<20). Such a high room-temperature dielectric constant arises from the cooperative secondary relaxation between two blocks which increases the relaxation amplitude of CSA and DY7, both of which have large dipole moments.

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