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Electro-Spinnability of Polystyrene Nanofibers: Influence of Solvent Functionality on Productivity

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In order to produce nanometer-sized fibers in the industrial scale, the productivity of the fibers is important. Here, we have investigated the effect of solvent functionality based on eighteen different solvents on the productivity of electrospun polystyrene (PS) nanofibers. The solution concentration was varied between 10 and 30% w/v. Electrospinning of PS solutions were carried out at various applied voltage and tip-to-collector distances. The productivity of the obtained PS nanofibers was quantified by means of image analysis of the scanning electron micrographs. For solvents with moderate molecular weight, high dipole moment, and low viscosity, the chance for the resulting PS solution to be spinnable is greater. General guidelines for choosing suitable solvents for successful production of electrospun nanofibers have also been proposed.