

**EFFECT OF PROCESS CONDITION AND SOLVENT SYSTEM  
ON MORPHOLOGICAL APPEARANCE OF ELECTROSPUN  
POLYSTYRENE FIBERS**

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## บทคัดย่อ

จirnันท์ มณีอินทร์ : ผลกระทบของสภาวะการทดลอง และระบบตัวทำละลาย ต่อ  
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 ค่าไดอิเล็กทริก (dielectric constant) สูง และความแตกต่างของค่าการละลายมาก จะเป็นตัวกำหนด  
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## ABSTRACT

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Electrospinning is a process that produces continuous polymer fibers with diameters in the sub-micron range through the action of a strong electric field applied across a needle connected to a syringe containing polymer solution and a collector screen. Various polymers have been successfully electrospun into ultrafine fibers in recent years, mostly from polymer solutions or melts. But little work was carried out to comprehend the effect of processing conditions and solvent system. In the present contribution, morphological appearance of as-spun polystyrene (PS) fibers was investigated in terms of solvent properties (i.e. molecular weight, boiling point, density, dipole moment, dielectric constant, and solubility parameter), solution parameters (i.e. concentration, viscosity, conductivity, and surface tension) and process parameters (i.e. applied voltage, collection distance, emitting electrode polarity, and salt addition). Furthermore, the effect of single solvent (i.e. dichloroethane (DCE), dimethylformamide (DMF), ethylacetate (EA), and methylethylketone (MEK)) and mixed solvent systems on diameter and morphological appearance of the as-spun fibers were also investigated using scanning electron microscope (SEM). Results demonstrated that both the increase in the applied voltage and the decrease in the collection distance resulted in an increase in the fibers diameter and the morphology changed from beaded fiber to uniform fiber structure. In mixed solvent system, the decrease in an average fiber diameter could be the result of a decrease in the viscosity as well as an increase in the conductivity with decreasing dimethylformamide content in this system.

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