

EFFECTS OF ELECTROSPINNING PARAMETERS ON MICROSTRUCTURE OF POLYSTYRENE FIBROUS MATS

Sina Yousefi¹, Hooman Tafreshi¹, Behnam Pourdeyhimi²

¹Virginia Commonwealth University, ²The Nonwovens Institute, NC State University

Electrospinning is a straightforward method to produce polymer fibers from a polymer solution. In this talk, we present a mathematical model developed to serve as a tool to simulate the 3-D morphology of electrospun fibrous materials. The model is based on a mass-spring-damper representation of the fibers and allows for realistic simulation of fiber curvature at the fiber–fiber crossovers. The simulations were calibrated using experimental data obtained by electrospinning Polystyrene fibers. With the calibrated code, we then studied the effects of electrospinning condition (e.g., voltage or needle-to-collector distance) on the microstructural properties (e.g., thickness or porosity) of the resulting fibrous mats.