

MOLECULAR INSIGHT INTO NEEDLELESS ELECTROSPINNING TECHNOLOGY

JIRSÁK Jan, MOUČKA Filip, NEZBEDA Ivo

J. E. Purkinje University in Usti nad Labem, Usti nad Labem, Czech Republic, EU

Abstract

Electrospinning from the free surface of polymer solutions, such as the patented NANOSPIDER(TM) technology, successfully produces fibres only in a narrow window of conditions (applied voltage, solution composition, temperature, etc.). The lack of understanding of the process at a molecular level makes the determination of the suitable conditions rely essentially on the trial-and-error approach. The present contribution is focused on applying molecular simulation methods to the process. We employ molecular dynamics with the intermolecular potentials commonly used in liquid-state simulations to model the surface of the electrospun solution phase subject to a strong electrostatic field. Our method helps us reveal the microscopic picture of the jetting onset and identify the role of solution components, viz water, ions, and macromolecules.

Keywords: Electrospinning, molecular simulation

Author did not supply full text of the paper/poster.