COMPARISON OF PRODUCTIVITY OF DIFFERENT TYPES ELECTROSPINNINGS

PETRÁŠ David, SLOBODIAN Petr & KIMMER Dušan

Thomas Bata University, Zlín, Czech Republic, EU

Abstract

Electrospinning is very frequently used method for preparation of submicron polymer fibers and nanofibers in a laboratory scale in the form of non-woven textiles for many years. The simple feasibility is the main cause for it´s using in this scale. By contrast, in industrial scale it is not so easy. Application of electrospinning for industrial production of nanofiber based textiles is often criticized for low productivity. To solve this problem is often directed to the modification of the process electrodes and especially spinning process electrodes (an electrode that is in contact with raw material and the own process starts on) is requested. This is justified because the parameters of the process electrodes, in addition to other parameters (e.g. material properties, structural fabrics, etc.) are the key ones. The most widely used process spinning electrodes now are metal electrodes in the form of nozzles. They are also used the electrodes in the form of various wetted rotating bodies, which have already occurred in the well known Formhal´s patent in the thirties of the 20th century. This work focuses on comparison of electrospinning process productivity of several types of already existing literature and patent electrodes: steel nozzles and wetted rotating electrodes in the form of a smooth cylinder, the system blade tips and the system of steel wire moving on cylindrical surface. Productivity was measured as the number of resulting nanofiber layer (fabric) per unit of time comparable to the microscopic parameters of nanofibers. As the model polymers the commercial polyurethane, polystyrene and polyvinyl alcohol have been selected.

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