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# Luminescent Dye-Doped Polymer Nanofibers Produced by Electrospinning Technique

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**Abstract :** Among the numerous methods for obtaining polymer nanofibers, the electrospinning technique distinguishes itself due to the more growing interest induced by its proved utility leading to developing and improving of the method and the appearance of novel materials. In particular, production of polymeric nanofibers in which different dopants are introduced was intensively studied in the last years because of the increased interest for the obtaining of functional electrospun nanofibers. Electrospinning is a facile method of obtaining polymer nanofibers with diameters from tens of nanometers to micrometrical sizes that are cheap, flexible, scalable, functional and biocompatible. Besides the multiple applications in medicine, polymeric nanofibers obtained by electrospinning permit manipulation of light at nanometric dimensions when doped with organic dyes or different nanoparticles. It is a simple technique that uses an electrical field to draw fine polymer nanofibers from solutions and does not require complicated devices or high temperatures. Different morphologies of the electrospun nanofibers can be obtained for the same polymeric host when different parameters of the electrospinning process are used. Consequently, we can obtain tuneable optical properties of the electrospun nanofibers (e.g. changing the wavelength of the emission peak) by varying the parameters of the fabrication method. We focus on obtaining doped polymer nanofibers with enhanced optical properties using the electrospinning technique. The aim of the paper is to produce dye-doped polymer nanofibers' mats incorporating uniformly dispersed dyes. Transmission and fluorescence of the fibers will be evaluated by spectroscopy methods. The morphological properties of the electrospun dye-doped polymer fibers will be evaluated using scanning electron microscopy (SEM). We will tailor the luminescent properties of the material by doping the polymer (polyvinylpyrrolidone or polymethylmetacrilate) with different dyes (coumarins, rhodamines and sulforhodamines). The tailoring will be made taking into consideration the possibility of changing the luminescent properties of electrospun polymeric nanofibers that are doped with different dyes by using different parameters for the electrospinning technique (electric voltage, distance between electrodes, flow rate of the solution, etc.). Furthermore, we can evaluated the influence of the concentration of the dyes on the emissive properties of dye-doped polymer nanofibers using different concentrations. The advantages offered by the electrospinning technique when producing polymeric fibers are given by the simplicity of the method, the tunability of the morphology allowed by the possibility of controlling all the process parameters (temperature, viscosity of polymeric solution, applied voltage, distance between electrodes, etc.), and by the absence of necessity of using harsh and supplementary chemicals such as the ones used in the traditional nanofabrication techniques. Acknowledgments: The authors acknowledge the financial support received through IFA CEA Project No. C5-08/2016.

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