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Abstract

Electrospinning is the one of the most versatile techniques to design nanofiber materials with numerous applications in the fields of energy conversion, catalytic chemistry, liquid and gas filtration.[1] By electrospinning, complex structures can be designed from a rich variety of materials including polymers, metals, ceramics and composite, with the ability to control composition, morphology and secondary structure and tailor performance and functionality for specific applications. Moreover, with recent developments in the design of electrospinning equipment and availability of industrial-scale electrospinning technologies with production rates of several thousands of square meters per day new opportunities for electrospinning are imminent. With this, the advanced research on materials performed in our labs is getting closer to the commercialization of new products for applications in fields of energy and environment.

An overview will be given on electrospinning activities at DTU Energy that address the sizable challenges in energy and environmental applications by electrospinning: 1. Electrospun perovskite oxide nanofiber electrode for use in solid oxide fuel cells. In this application, a $(La_{0.6}Sr_{0.4})_{0.99}CoO_{3-\delta}$ cathode was shaped into 3-dimensional thin-film by so-gel assisted electrospinning method combined with calcination and sintering; 2. Electrospun nanofiber materials for gas adsorption. Both the advantages and challenges of using electrospun nanofiber materials will be discussed, in terms of electrochemical performance, surface area, packing efficiency and mechanical stability.

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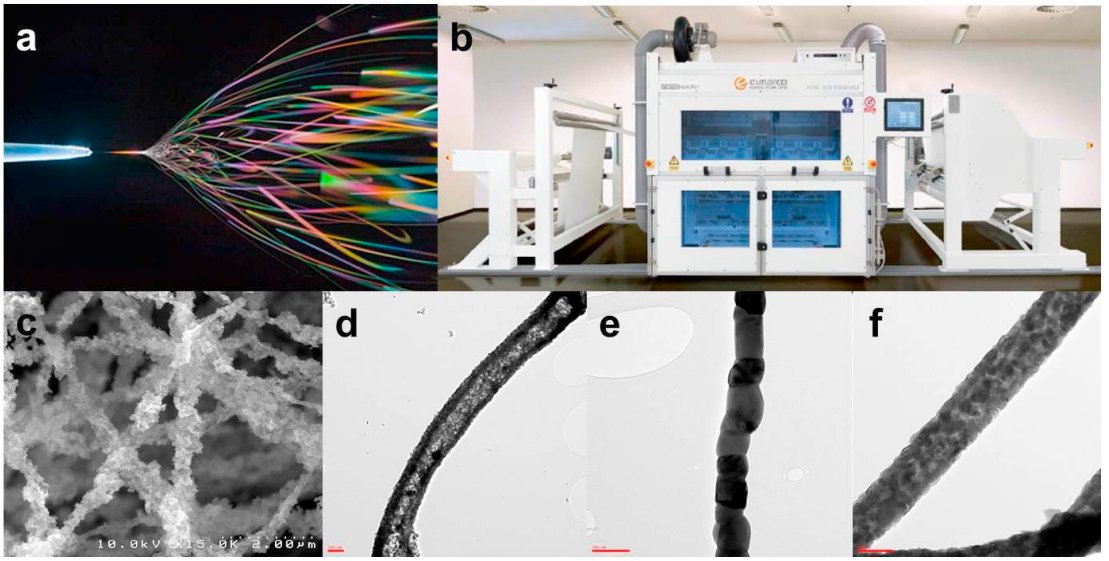

Figure 1. a) Electrospinning process; b) Industrial-scale electrospinning equipment (Elmarco); c) Pt-C/Nafion nanofiber electrodes for proton exchange membrane fuel cells[2]; d) metal oxide nanotubes; e) metal oxide nano-pearl string; f) metal oxide nanofiber.[3]

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