# Three-dimensional Nanofiber Cathode for Low Temperature and High Temperature Fuel Cells

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# Three-dimensional Nanofiber Cathode for Low Temperature and High Temperature Fuel Cells

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Electrochemical devices for clean energy conversion such as proton exchange membrane fuel cells (PEMFCs)[1-3] and solid oxide fuel cells (SOFCs)[4-5] are currently and for the foreseeable future very much in the spotlight. Although these developing energy technologies have seen a rapid development, new break-through developments are needed to improve their durability, efficiency, power density and cost to make them commercial viable.

Electrospinning provides possibilities of generating composite networks from a rich variety of materials with the ability to control composition, morphology and secondary structure. Moreover, it is easy to scale up for inductrial production. This simple and versatile method has been used in this research to address the sizable challenges facing those involved in materials research into energy conversion devices.

The objective of this poster is to show the potential of electrospinning in designing nanostructures of both organic and inorganic materials in electrochemical devices. Herein, we present results on 1) Nafion/ Pt-C composite cathodes for PEMFCs; 2) LSCF nanofiber cathode for SOFCs. Exceptionally high power densities and platinum mass activity are achieved when using the nanofiber mat as cathode in PEMFCs. The nanofiber cathode also exhibits outstanding stability in accelerated durability tests.[6] In case of SOFCs, lanthanum strontium cobaltite ion perovskite nanofibers with controllable nanostructure were synthesized by combining sol-gel synthesis, electrospinning and sintering.

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