

229e Using Template Synthesis of Nanowires to Manufacture Arrays of Nano Fuel Cells

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Fuel cells are an emerging technology with the potential to replace many forms of energy conversion devices, among them lithium-ion batteries for portable-power applications. Thermodynamics limits the open circuit voltage of individual fuel cells to about 1V or less while lithium-ion cells can show nominal voltages of 3.7V. In order to increase the voltage of the power system, fuel cells need to be wired in series to obtain useable voltages.

In large-scale (>100W) systems, individual fuel cells are stacked on top of each other to obtain series connectivity. This design requires the use of fuel and air manifolds which increases the system complexity. Development of co-planar arrays of fuel cells which can be wired as desired outside of the array can reduce the complexity of fuel-cell systems for portable-power applications.

We describe the use of the template synthesis of metallic nanowires in anodisc membranes as a means of producing arrays of nano-sized fuel cells which are electrically isolated from each other. This inexpensive method enables the wiring of the fuel cells in parallel or series as desired.