

Nanoengineered Membranes for Controlled Transport

Disclosure Number

200100993

Technology Summary

The invention pertains to the use of carbon nanofibers (CNFs) as membranes for controlling molecular transport. These devices provide nanoscale control of molecular transport by mimicking biological cellular membranes. Semi-permeable membranes are created from the directed self-assembly of CNFs, allowing for the passage of molecules smaller than the wall to wall spacing of the CNFs. The diffusion limits can be controlled by the separation of the fibers, both laterally and along the direction of transport. Chemical potential gradients can be engineered and used to direct transport. Advanced iterations of these membranes can involve chemical derivatization of the fibers to further affect the diffusion limits or possibly affect selective permeability or facilitated transport. Additionally, individually addressable CNF electrodes can be integrated with the membrane to provide an electrical driving force for transport and an electronic interface in the fluid for control and detection.

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