CBI ERLANGEN

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Switching Transport with Polymers in Mesopores

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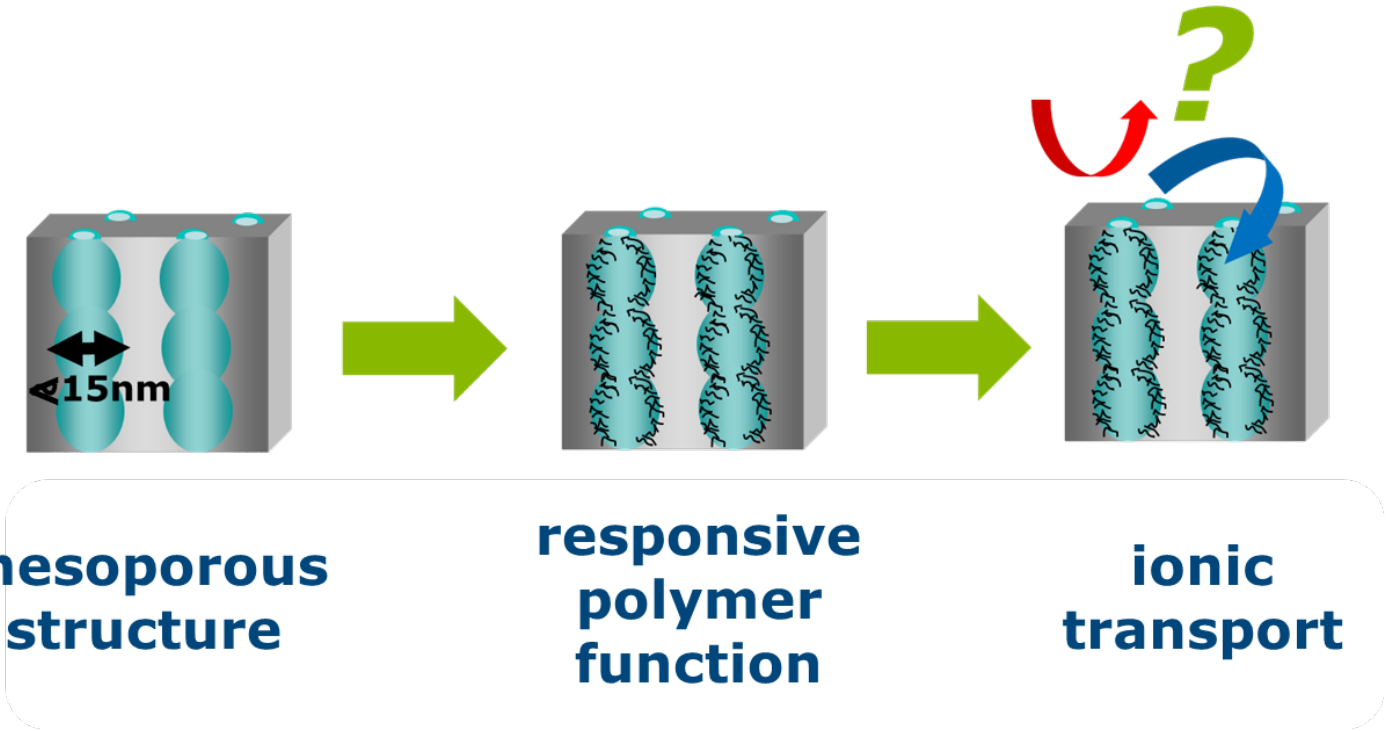

Polymer-functionalized mesopores allow molecular control over nanostructural and chemical features, provided by self-assembly techniques, and controlling chemistry in confined pores. Controlling structure and function on the nanoscale is a major challenge in the fabrication of functional nanodevices. In nature, the functionality of biological ion channels is closely related to their nanometer scale structure and function. As synthetic membranes, inorganic polymer-hybrid films allow an organized assembly of different functionalities at the molecular level. The combination of such mesoporous membranes with polymer-functionalization enables responsive chemical functionality and surface properties, by adjusting chemistry in confined pores. We currently investigate different attempts to adjust the polymer functionalization in mesoporous thin films in a controlled manner. By adjusting the type and amount of polymer the number of charges, the responsiveness at the pore wall surface can be regulated. This results in a control and gating of ionic permselectivity. Besides understanding of confinement effects this may lead to improved applications in separation, sensing or lab-on-chip devices.

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