Next generation of ionic transport control in nanofluidics by integration of conductive polymers into asymmetric solid-state nanopores

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During the past decade there have been large advances in nanofluidics due to the fact that the scientific community has fully acknowledged the importance of this field for controlling the transport of ionic species in miniaturized devices. In this presentation, I will show our recent experimental and theoretical results about how the regulation of the surface charge density and distribution allows modifying the permselectivity and consequently the conductance of solid-state nanopores showing both ohmic (ionic resistor) and non-ohmic (ionic diodes) behaviors. Furthermore, I will discuss our recent results on integrating conductive polymers within solid-state nanopores using different synthetic approaches offering new possibilities for developing electrochemically-controlled nanofluidic devices and conversely, the possibility of obtaining physical and chemical information of conductive polymers such as electrochemical state, surface charge or acid-base equilibrium by studying the nanofluidic output.

References

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