Electrostatic-driven pattern formation in fibers, nanotubes and pores

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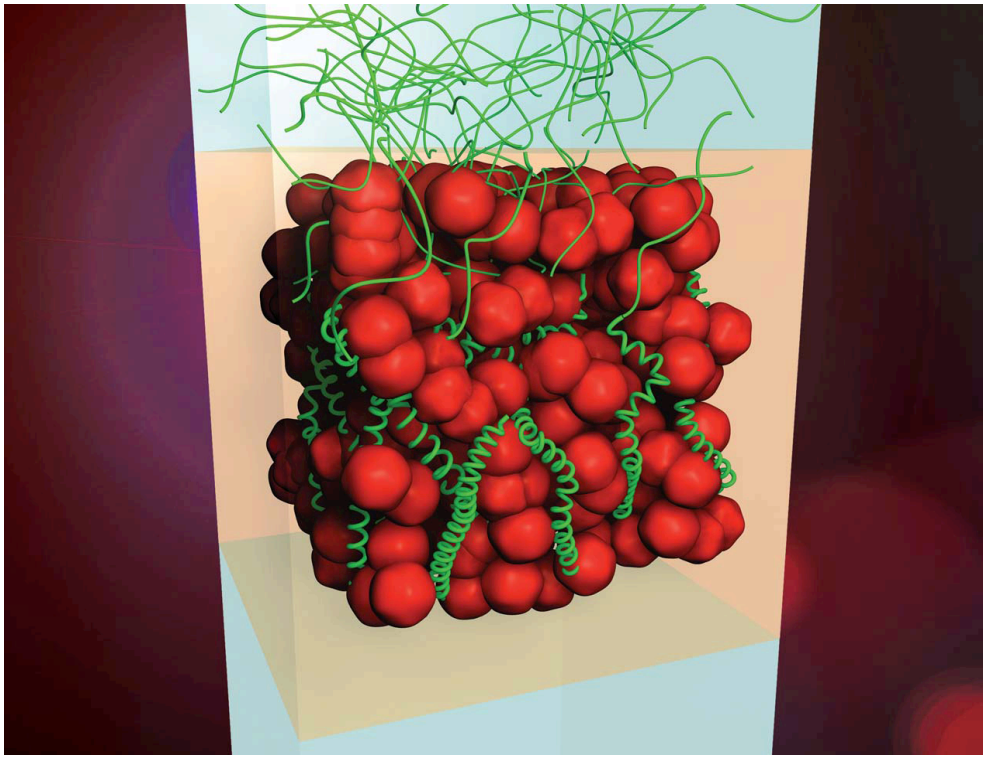
Most membranes for environmental processes, such as sea water desalinization, have charged surfaces with pores of nanoscale dimensions. The adsorption of charges in porous ceramics, organic membranes, clay and soil is controlled by the ionic conditions of the surrounding media. A specific aspect of interest when considering these systems is the analysis of the nanonscale charge distributions of adsorbed polyions, especially in the case where the adsorbed ionic species can form patterns.



We develop here a formalism based on Green's function to analyze the surface of charged porous media in different ionic solutions. In particular, we apply this formalism to determine the conformation of adsorbed linear charged chains onto the pores' surface. We have characterized the likely presence of helical phases in self-assembled ionic systems in cylindrical geometries for the more realistic scenario where the permittivity is different across the cylindrical interface.

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