

Equilibrium Adsorption of Hexahistidine on pH-Responsive Hydrogel Nanofilms

Gabriel S. Longo , Monica Olvera de la Cruz and Igal Szleifer

Hydrogels formed by cross-linked pH-sensitive polymer chains display large, reversible volume transitions in response to variations of the acidity of the solution in which they are immersed. Here, molecular theory is used to study the adsorption of different species within pH-sensitive hydrogel nanofilms. We concentrate on the adsorption of hexahistidine, one of the most widely used tags in bio-related systems, particularly in chromatography of proteins. The adsorption of hexahistidine within a grafted polyacid hydrogel film shows a nonmonotonic dependence on the solution pH.

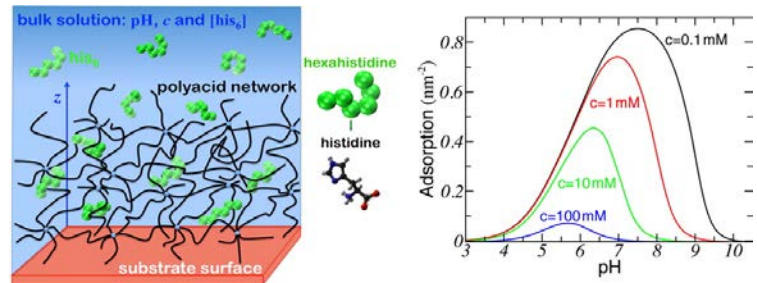


Figure. (a) Schematic representation of the system of interest. The picture illustrates a surface-grafted polymer network that can adsorb hexahistidine (or other solute molecules) from a solution with controlled pH, salt concentration, c , and adsorbate concentration, $[a]$. (b) Adsorption as a function of the pH for bath solutions having different salt concentrations and $[\text{his}_6] = 1 \text{ mM}$.

Gabriel S. Longo , Monica Olvera de la Cruz and Igal Szleifer "Equilibrium Adsorption of Hexahistidine on pH-Responsive Hydrogel Nanofilms" *Langmuir*, 30, 15335-15344 (2014)