Adsorption of poly(mono-n-alkylmaleate-alt-N-vinyl-2-pyrrolidone) sodium salts at air/water interface

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The surface properties of poly(mono-n-alkylmaleate-alt-N-vinyl-2- pyrrolidone) sodium salts derivatives with n=8, 10, 12, 16, and 18 carbon atoms in the side chain were analyzed. The surface tension behavior suggests that the adsorption at the surface is competitive with the polyelectrolyte "micellization" in the bulk. In fact, polyelectrolytes containing shorter side chains are more active at the surface than are polyelectrolytes with larger lateral chains. The contributions to the standard free energy of the adsorption process, related with their efficiency and effectiveness, were +1.07 kJ and -0.61 kJ per mole of methylene group, respectively. A positive value for the incremental free energy suggests that the gradual addition of methylene groups to the polyelectrolyte side chain actually stabilizes the polyelectrolyte in the bulk solution, whereas a negative value makes the packing process of the polyelectrolyte hydrophobic tails more spontaneous in an arrangement normal to the surf