



"Soft-Matter-Seminar"

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**Charging behavior of polyamines in solution, at surfaces and in "frozen" micelles:
An experimental study**

The focus of the talk is the experimental studies which reveal the protonation mechanisms of polyamines in three different states: as dissolved in water, adsorbed on weakly acidic surfaces, and in the so-called "frozen" micelles.

In the first part, the protonation mechanisms of dendritic polyamines will be presented. The experimental proton binding isotherms can be very well described by a discrete site-binding model. With a limited number of parameters, this model provides both macroscopic, and microscopic picture of protonation. The comparison between the poly(amidoamine) (PAMAM) and poly(propyleneimine) (PPI) dendrimers is illustrative of the relation between the protonation mechanisms and the molecular structure.

In the second part, the focus is on the strongly cationic poly(diallyldimethylammonium chloride) (DADMAC) which is adsorbed on weakly acidic surfaces. In this case, a charge reversal occurs in a narrow pH-range, which represents the point of zero charge. In the first approximation, the experimental data can be rationalized in terms of the Stern model, and the surface dissociation reactions.

The charging of the poly(styrene)-b-poly(N,N dimethylaminoethylmethacrylate) (PS-b-PDMAEMA) will be presented in the third part. In water, this amphoteric block-copolymer is present in the form of core-shell particles, which consist of poly(styrene) core and a polyelectrolyte corona (aka the "frozen micelles"). The proton binding isotherms of the corona indicate an interplay between the electrostatic and hydrophobic interactions, which is confirmed by the light scattering measurements. The latter measurements also reveal an ordering of the micellar system at low ionic strength, caused by long-range electrostatic interactions.

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