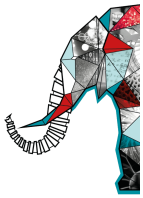
25e Congrès Général de la Société Française de Physique



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Structure, thermodynamics and kinetics of a model polyelectrolyte coacervating system

The topic of coacervation has recently regained interest because of its relevance for the design of artificial cell-like environments in which the activity of biological molecules is preserved and even increased in some cases. However, several questions related to the structure, kinetics and thermodynamics of coacervates remain unsolved and require more fundamental research. We propose here to study some of these aspects with a fully synthetic model system based on polyacrylic acid (PAA) and poly(diallyldimethylammonium chloride) (PDADMAC) oppositely charged polyelectrolytes (PEs) at pH 10. The results obtained with this system are believed to apply to most natural and synthetic coacervatiing systems.

Among the main points of interest regarding the coacervate structure and properties, we can highlight (i) the formation of PE complex particles as precursors of the dense coacervate phase; (ii) their rapid reorganization (~100 ms to ~1s) near stoichiometry in droplets (liquid-liquid phase transition), (iii) the formation of a disordered structure similar to that of semi-dilute solutions with some persistant heterogeneities, (iv) a decrease, of the chain dynamics in the coacervate phase, (v) the endothermicity of the coacervation process in relation to the initial hydrated state of the polyelectrolytes that opposes to complexation.

Choix de session parallèle

4.2 Physique des polymères: de la molécule au matériau

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