CRYSTALS AND CELLS AS CORES FOR POLYELECTROLYTE NANOCAPSULES STUDIED BY CONFOCAL, TWO-PHOTON AND ATOMIC FORCE MICROSCOPY

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Nanocapsules represent a comparatively new class of colloids with controlled nanostructure. A nanocapsule is a polyelectrolyte (poly-(styrenesulfonate, sodium salt) and poly-(allylamine hydrochloride), PE) multilayer shell assembled by electrostatic adsorption onto inorganic, organic and bio- cores. Main features are: wall thickness tunable in the nm range (~ 1.5 nm/layer), size range 100 nm - 10 μm, tunable wall composition, functionalizible surface, permeability modulated by cores and by pH. The use of crystals as core influences the wall texture and the properties of the capsules. Yeast cells constitute a candidate as core. They are a good system for testing the protective ability of shells and the permeability of the walls with respect to the needs of biological systems, namely: feeding and stability against attacks. The structure and the permeability properties of the shells have been studied by two-photon and confocal microscopy, in the hydrated state. The fine morphology has been characterized by atomic force microscopy on dried capsules adsorbed on mica. Nanocapsules are of both biological and medical interest since they can be used, for example, for the controlled release and targeting of drugs as well as for the protection of enzymes and proteins.