

# **Controlled Release Systems: Advances in Nanobottles and Active Nanoparticles**



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#### Controlled Release Systems: Advances in Nanobottles and Active Nanoparticles

In the area of controlled release of active substances, such as drugs, a strong interest in nanoparticles as carriers of active ingredients has arisen. Some of the active components are extremely hydrophobic, without cellular permeability and susceptible to metabolic degradation. Owing to this, their use is limited. This kind of agent can be transported without any problem through physiological media by using nanoparticles. The size of particles is an important parameter because it governs the efficiency of the delivery system. For this type of application, particles that have a diameter smaller than 1 µm are especially useful. Polymeric nanoparticles that have diameters in the colloidal range are produced by means of polymerization processes in dispersed media. Drugs are taken up into the nanoparticles by adsorption, absorption, or "entrapment," or covalent bonding and they are delivered (release) by desorption, diffusion, polymer degradation, or a combination of these mechanisms.

Nanoparticles (including nanogels) that release their contents by external triggering open up new possibilities for therapeutic strategies. External triggering by light, heat, change in pH, or application of ultrasound opens up the possibility to release the material on demand. If only a part of the wall of the nanoparticle (nanocapsule) is responsive, we are dealing with the so-called nanobottles, a nanocontainer with the active substance and a lid on the container that can be "opened" and "closed" by external triggering.

This book focuses on responsive nanoparticles and brings together two interesting areas: nanoparticles and responsive polymers. The concept of the book is that of a systematic approach from nanoparticles synthesis via responsive polymers to nanobottles. The second part of the book presents contributions from experts in the field and provides a state-of-the-art overview of the field.



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