Nanoparticles as active absorption centres on flat surfaces and spherical microcapsules

A. G. Skirtach1*

1MPI of Colloids and Interfaces, Potsdam/Golm, Am Mühlenberg 1, Germany
* e-mail: skirtach@mpikg.mpg.de

Nanoparticles are known to absorb electromagnetic energy and convert it to heat. In this report we will present effects of localized heating on polymeric membranes of spherical microcapsules and planar interfaces. The distribution of nanoparticles, i.e. aggregated versus non-aggregated state, can be controlled by polymers, the concentration of nanoparticles and nanoparticle growth conditions. Aggregation is preferential for absorption of near-IR (infrared) light. A number of various phenomena can be investigated by proper distribution of nanoparticles and subsequent, remote action of electromagnetic field.

In this talk several effects will be considered: control of the permeability of polyelectrolyte multilayer capsules, remote effects of planar polymeric layers and substrates, as well as Raman effects on these substrates [1].

![Image](image_url)

**Figure 1.** Effect of near-IR laser on aggregates of gold nanoparticles adsorbed at the surface of thick polymeric films.

Figure 1 shows localized cross-linking of the upper layer of a thick polyelectrolyte multilayer film. Such an approach allows for localized cross-linking of the upper layer of films. That can be used for writing on films or for release of molecules bound to the films. This can be also used for controlling the interaction of films with cells as well as with various molecules, including DNA.

The same effect induced Raman amplification of signals, which can be used for molecular mapping on various substrates. Even more peculiar that can be used for monitoring the state of molecules.

[1] A. G. Skirtach et al. to be submitted for publication