Atomic Force Microscopy (AFM) studies of model pulmonary surfactant in presence of nanoparticles

M. Ferrari*, L. Liggieri, F. Ravera, E. Santini and E. Guzman

CNR-Institute for Energetics and Interphases, via De Marini 6, 16149 Genova, Italy
*email: m.ferrari@ge.ieni.cnr.it

Nanoparticles toxicology is a topic of great interest considering their presence in the environment, their interaction with human physiology and in particular with their effect on some parameters of respiratory fluids behaviour.

Pulmonary surfactants allow the air-fluid interfacial energy to be minimized during the respiration activity and compositional changes of the fluid are a key point in determining pathological conditions.

In this work, monolayers of DPPC (Dipalmitoylphosphatidylcholine), PA (Palmitic Acid) and their mixtures, as model systems for pulmonary surfactant, have been investigated by AFM.

AFM has been used to study the morphology of films deposited during BAM experiments on a Langmuir trough at different degree of monolayer compression and corresponding to different thermodynamic and aggregation states of the composite layer with and without the presence of solid nanoparticles (NP).

A preliminary comparison between these AFM results and the Brewster Angle Microscopy (BAM) surface analysis images is also presented.

In this way structures whose features depend on the different surface pressure conditions have been evidenced, as well as the effects of the presence of NP of different nature.