ANNEX

1. Langmuir- Blodgett technique

The Langmuir- Blodgett technique is one of the most widespread and powerful methods for the formation of ultra-thin ordered multilayer films with well-defined molecular orientation and an ordered layer structure. The thickness of the LB film is controlled by the number of organic layers deposited. In addition, other significant properties such as density and homogeneity of the monolayers are preserved when transferring the Langmuir film. Thus, by the Langmuir- Blodgett technique we can control the degree of surface coverage is deposited onto the solid surface depending on the pressure applied. In Figure 1 can be observed how the LB deposition is and the film is formed.

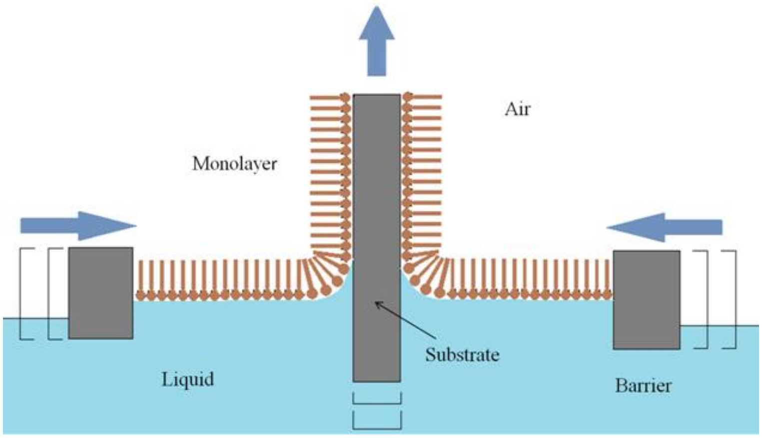

Figure 1. Langmuir-Blodgett deposition vertical dipping

2. AFM (Atomic Force Microscopy)

AFM (Atomic Force Microscopy) was invented in 1986 by G. Binnin, C.F Quate and C.Gerber. It is based on the same concept: the measurement of the interaction existing between the surface of the sample and a sharp tip while scanning the surface.

In Atomic Force Microscopy the images of a particular sample are generated from the attraction and repulsion forces existing between a sharp tip attached to a cantilever and the surface of this sample. These forces are detected by measuring the deflection of the cantilever. The tip scans the surface and is displaced vertically by atomic forces which are attractive o repulsive depending on the distance between the sample and the tip. The force is measured by monitoring the deflection of the cantilever through a laser spot reflected from the surface of the cantilever into an array of photodiodes which generates a voltage proportional to the received intensity, as it can be observed in the Figure 2 In the tapping mode, the tip touches the surface in each oscillation. The amplitude of this oscillation decreases as the tip approaches to the sample due to the above mentioned interaction forces.

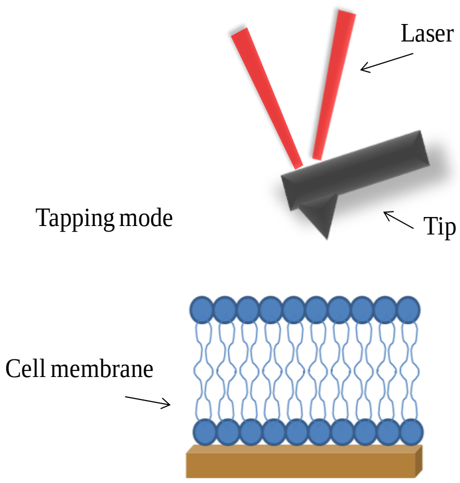

Figure 2. Representation of the tapping mode measurement

3. Theoretical height of DPPC

In the Figure 3 which is part of the Supplementary information can be observed the theoretical height of a DPPC molecule.

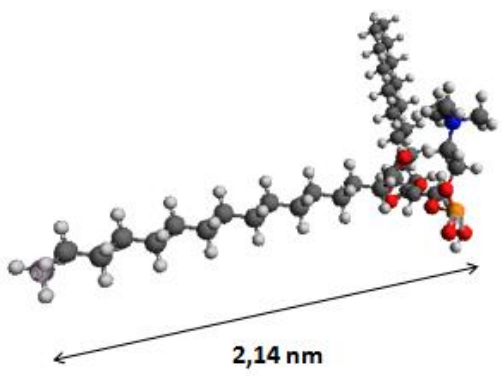

Figure 3. Theoretical height of a DPPC molecule by ChemDraw obtaining a value of 2.14 nm

4. Bearing Analysis

In the figure 4 the bearing analysis is shown.

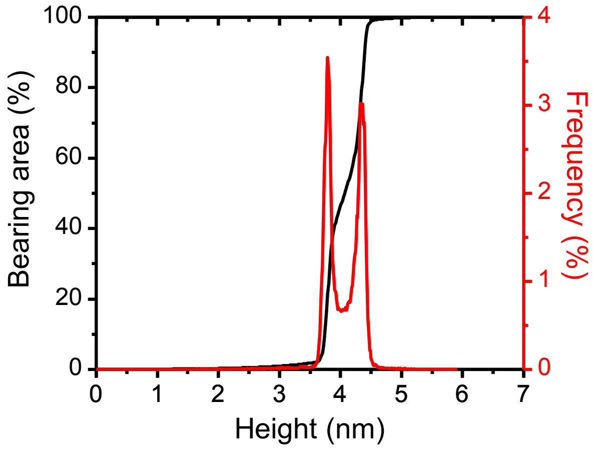

Figure 4. Bearing area analysis corresponding to a 5.0 x 5.0 μm^2 AFM image of a x_{DPPC} = 0.5 *immersed in 50μL of 10 mM HEPES (pH 7.4) for* t_i *= 45 min, black line. Height histogram corresponding to the same image, red line.*

5. Squared pattern onto the mica surface

In the Figure 5 the squared pattern onto the mica surface can be observed in more detail.

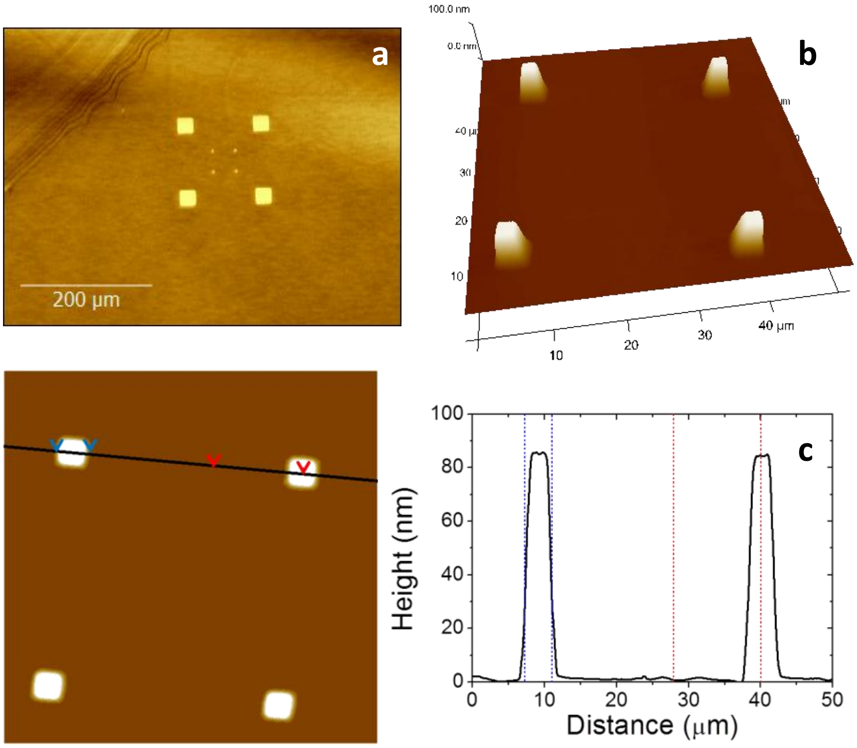

Figure5. (a) 600 x 450µm² optical image corresponding to the final squared pattern onto the mica substrate; (b) 50 x 50µm²3D AFM image showing the inner pattern in detail; (c) Cross section reveals the dimensions of the squared features grabbed on the mica surface.