150 Phase Transition Studies of a Biomimetic Sensor: DPPC/HEMA-DEGDMA Fibers/Substrate, using Ellipsometric technique

C.M. Gonzalez-Henriquez[1]*, G. del C. Pizarro[1], E.N Cordova-Alarcon[1], **L.D.Olmos-Sotomayor[1]** and M.A. Sarabia-Vallejos[2].

[1]*Departamento de Química, Universidad Tecnológica Metropolitana, Santiago, Chile,*

[2]*Instituto de Física, Pontificia Universidad Católica de Chile, Santiago, Chile.*

email address corresponding author: carmenmabel@gmail.com

The design and characterization of an artificial stable biomembrane has been the focus of many research groups. The cell membrane plays an important role in regulation of different biological process such as signal transduction, cell adhesion, etc. [1]. However, the essential problem of this conformation lies in the low stability of the phospholipid bilayer when it is exposed to extern temperature stimulus [2]. Nagle et al., demonstrate that the phase transition and the bilayer integrity are maintained in a wet environment [3].

This study seeks to achieve a stable design and a subsequent characterization of a biosensor, formed by DPPC/HEMA-DEGDMA fibers/Substrate. The hydrogel is composed by HEMA and DEGDMA (crosslinking agent) in a molar ratio of 100:1, respectively (Fig. 1). The photo-initiator used in the reaction is Irgacure 651. The incorporation of DEGDMA with HEMA increases the hydrogel swelling ratio; this monomer provides more –OH groups and strong –H bonding interaction.

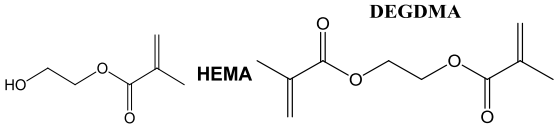

Fig. 1 *HEMA and DEGDMA monomers used in the synthesis*

To achieve fibers formation, electrospinning technique was used (Fig. 2) with 20-25 kV (~0.06 mA) at 8 cm from substrate. Over this, DPPC bilayer was deposited using Langmuir Blodgett technique.

Fig. 2 *Electrospinning assembly.*

The observed phase transition was studied using an ellipsometer, giving us information about the change in polarization angle and therefore the structural movement of the DPPC bilayer under temperature changes; surface morphology and sensor stability will studied by SEM micrographs.

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