Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

A prototype biosensor: artificial cell membrane on porous silicon[1]

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Biosensors have been studied in recent years because they are powerful instruments to detect physical or chemical parameters as, e.g., intracellular interactions. What we propose is a prototype biosensor based on an artificial cell membrane (DPPC) on porous silicon. Porous silicon is used as a sponge-like substrate to absorb water by capillarity and keep the membrane hydrated, which is essential for the membrane not to denature when performing temperature cycles. Thus, one can observe the phase changes of the cell membrane with temperature using optical and surface scanning methods. In this research we used the technique of Very High Resolution Ellipsometry (VHRE) to observe changes in the ellipsometric angles during temperature ramps, which are attributed to different lipid phase transitions. Imaging ellipsometry (IE) was used to observe surface changes at the microscopic level and Atomic Force Microscopy (AFM) to observe changes in the topography of the membrane at the nanoscale.

[1]This work was supported by Fondecyt 1100882, DAAD-Conicyt PCCI 044, Conicyt Scholarship and Project Anillo ACT 1107.

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Date submitted: 15 Nov 2013 Electronic form version 1.4