Langmuir and Langmuir-Blodgett Films Study of a New Phenylene Ethynylene Oligomer

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Miniaturization of electronic and mechanical devices at nanoscale level has grown rapidly in the last decades along with a social demand for tinier devices though keeping or increasing their efficiency. With the purpose of providing a complete study on molecules capable of becoming an active part of such devices, our investigation is focused on Langmuir-Blodgett (LB) films fabrication using a new oligo(phenylene-ethynylene) (OPE) derivative, 4-[4-(4-methylthioacetate-phenylethynyl)-phenylethynyl]-aniline, called NOPES (see Figure 1), being a molecule susceptible of acting as a molecular wire due to its conjugated structure. Surface pressure and surface potential, Vs., area isotherms were obtained on a pure water subphase and on HCl, pH 3.0, subphase to reduce the tridimensional molecules aggregation phenomenon (see Figure 2). Monolayers were characterized by Brewster angle microscopy and UV-vis reflection spectroscopy. The Langmuir films were transferred onto solid substrates at several surface pressures and analyzed by UV-vis absorption, and atomic force microscopy (AFM). Both of the spectroscopic studies confirmed the two-dimensional aggregation. AFM images show a high surface roughness at low surface pressures, but at 15 mN/M surface pressure AFM images show high homogeneity at monolayer formation. These results could make possible the use of NOPES in the production of molecular electronic devices.

References:

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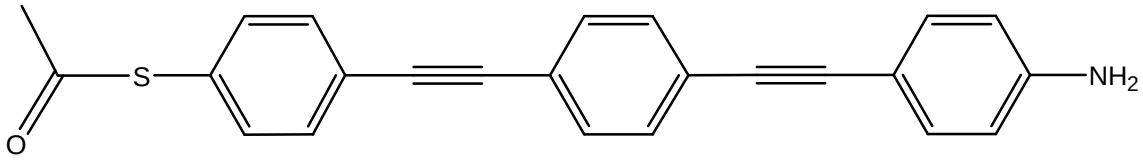

Figure 1. Chemical structure of the NOPES, new OPE derivate compound studied.

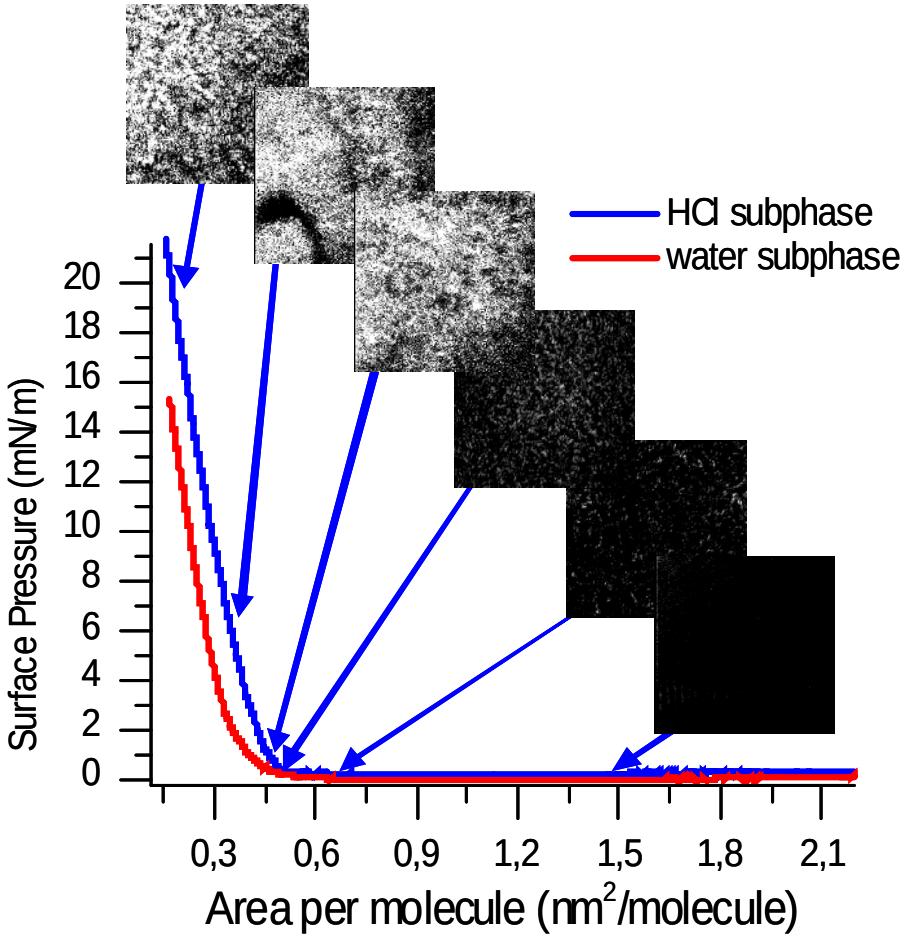

Figure 2. *π-A* isotherm and BAM images of the Langmuir films at the indicated areas per molecule for NOPES.

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