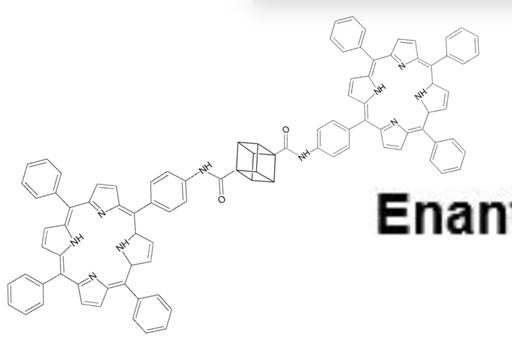
NewTimes – New Trends in Materials Science and Engineering
1st International Virtual Conference
14-18 June 2021

UNIVERSITÀ DEL SALENTO



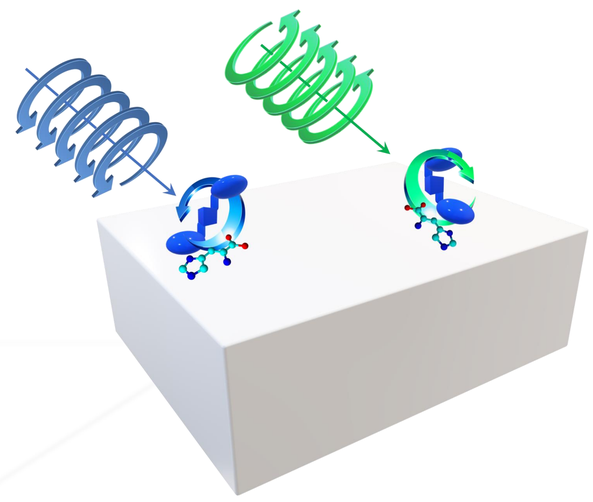
SESSION: 1 – Advanced materials for sensing technologies

POSTER presentation

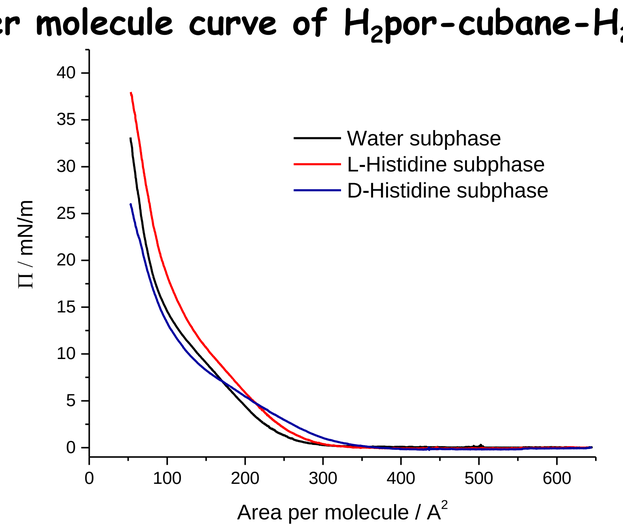
# Enantioselective discrimination of histidine by means of an achiral cubane-bridged bis-porphyrin

M. Ottolini, S. Bettini, Na Grover, C. Mattern, M. O. Senge, G. Giancane, L. Valli

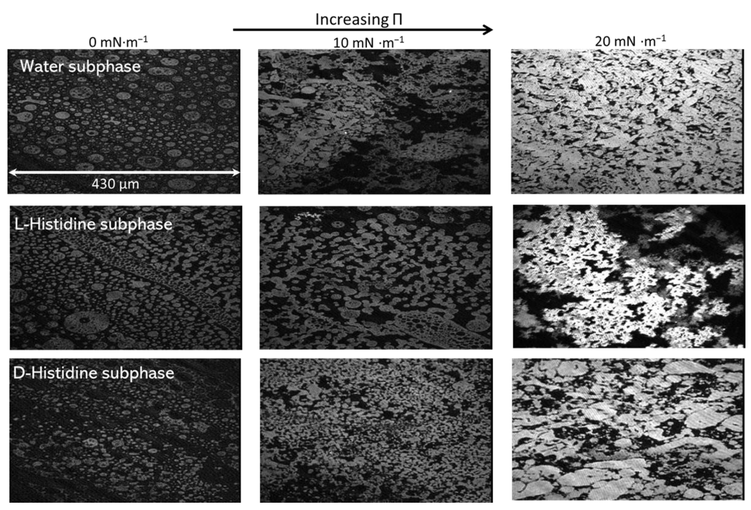
Bis-porphyrin (Bis-Pp) derivatives are known to change their configuration (*syn*, *tweezer* and *anti*) upon interaction with specific analytes. Additionally, Bis-Pp can form chiral supramolecular aggregates that can be exploited for chiral discrimination, as reported for similar systems. In this contribution, chiral discrimination of D- and L-histidine was demonstrated through the conformational switching of a cubane-bridged bis-porphyrin derivative, as Langmuir film and once deposited on solid supports using the Langmuir-Schaefer (LS) technique. The films were deeply characterized by UV-Visible absorption spectroscopy, Reflection Spectroscopy (RefSpec) and Brewster Angle Microscopy (BAM). Then, the mechanism of chiral selection was investigated by an ad-hoc modified nulling ellipsometer in order to have left-handed and right-handed circularly polarized light incident on the film samples. The obtained results showed significant variations in the conformation of LS films, suggesting an enantioselective interaction between LS film and both histidine enantiomers. The interaction mechanism, from a chemical point of view, and the selectivity of the sensing layer were investigated in presence of other amine and amino acid derivatives (as histamine, glycine, phenylalanine, lysine). In this way, amino acids bearing different side groups confirmed the key role played by the imidazole ring as well as the 3D structure of histidine enantiomers.



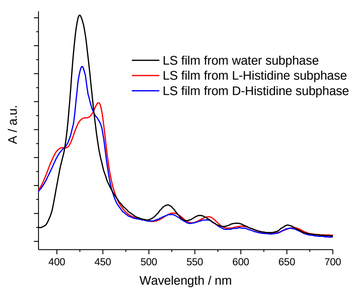
## Π vs Area per molecule curve of $H_2$por-cubane-$H_2$por

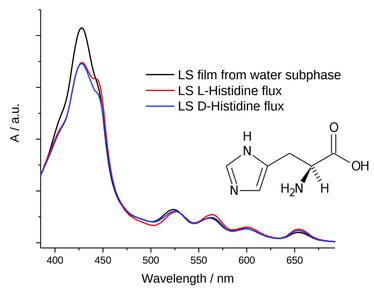


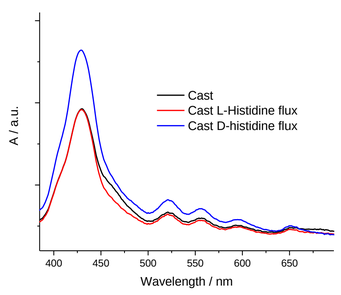

## Brewster Angle Microscopy (BAM) (at the air/water interface)

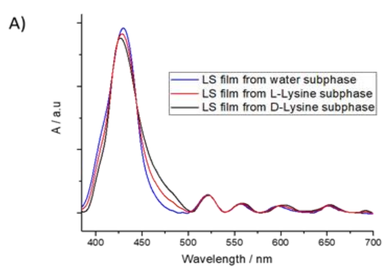


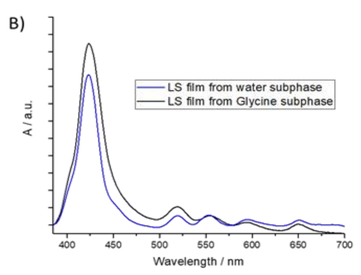

## LS Films spectroscopic characterization of $H_2$por-cubane-$H_2$por

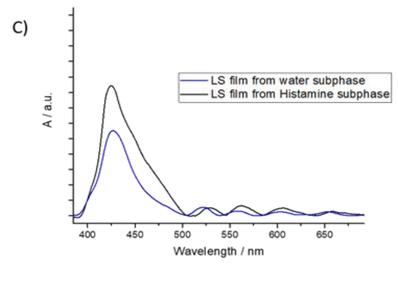


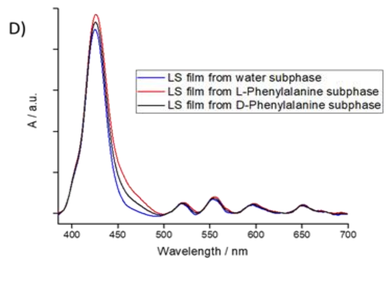




## Nonlinear Optical Null Ellipsometry of Chiral Film