

**PORPHYRIN-POLYMER LAYERS AT AIR-WATER INTERFACE: IN SITU X-RAY DIFFRACTION STUDY**

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Polymers of vinylpyridines are cationic polyelectrolytes. They belong to macromolecular chelates, which, due to pyridyl fragments, can coordinate metal ions and metal-containing compounds, in particular, metalloporphyrins. Possessing a unique set of properties, metalloporphyrins form supramolecular complexes with proteins and other components of living organisms. They play an important role in photosynthetic, respiratory, enzymatic and other functions.

In this work we present in situ grazing-incidence X-ray diffraction (GIXD) and X-ray reflectometry (XRR) study of the structure of polyvinylpyridine (P4VP) and zinc tetraphenylporphyrin-polyvinylpyridine (Por-P4VP) layers at air-water interface. The layer structure was analyzed within the framework of the model of a nanostructured M-monolayer [1, 2] using the quantitative method of compression isotherm analysis [3, 4].

GIXD data for P4VP layer, formed at surface pressure  $\pi=20$  mN/m, reveal periodicity corresponding to pyridine rings packing (0.41 nm) in the plane of the layer. Two periods corresponding to pyridine rings (0.41 nm) and porphyrin (0.37 nm) packing were detected for Por-P4VP layer. XRR data were processed directly from experimental data and using the BARD software package, which includes methods of multiple-scale wavelet analysis. It was shown that the total layer thickness of P4VP at  $\pi=20$  mN/m is 35 Å (close to double layer), whereas for Por-P4VP at  $\pi=25$  mN/m the thickness is 20-22 Å (close to monolayer).

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