# CONSIDERATION OF THE STABILITY OF A MOLECULARLY IMPRINTED POLYMER LAYER CONCERNING ITS THICKNESS

Greta Pilvenytė[1], Raimonda Bogužaitė[1], Vilma Ratautaitė[1], Arūnas Ramanavičius[1,2]

[1]Bioanalysis laboratory, Department of Nanotechnology , State Research Institute Center for Physical Sciences and Technology

[2]Department of Physical Chemistry, Institute of Chemistry, Faculty of Chemistry and Geosciences, Vilnius University

greta.pilvenyte@ftmc.lt

Molecularly imprinted polymers (MIP) are developed through the polymerisation of functional monomers in the presence of template molecules. However, a key step in the preparation of MIPs is template extraction after polymerisation. Polypyrrole has gained significant attention in sensor development due to its electrical conductivity, straightforward synthesis, and good mechanical properties. This makes it a promising option for the cost-effective fabrication of sensitive biosensors[1].

Achieving optimal stability and adhesion is crucial for reliable sensing. One prominent solution is the optimisation of the deposited layer thickness. Challenges such as detachment and reduced sensitivity can be addressed through precise layer thickness control, allowing for enhanced binding interactions with target molecules.

This presentation considers the stability of polypyrrole-based MIP layers with methylene blue molecule imprints, polymerised on an indium tin oxide-modified glass electrode. The polymer layer thickness is adjusted by varying the number of electropolymerisation cycles (5, 7, and 10) using cyclic voltammetry. Monitoring changes in absorbance were used for the evaluation of layer thickness[2]. This analytical approach provides valuable insights into optimising the design of molecularly imprinted polypyrrole electrodes for stable sensors.

[1] G. Pilvenyte et al., Molecularly imprinted polymers for the recognition of biomarkers of certain neurodegenerative diseases. J. Pharm. Biomed. Anal., 2023, 228, 115343.

[2] R. Boguzaite et al., Towards Molecularly Imprinted Polypyrrole-Based Sensor for the Detection of Methylene Blue. Chemosensors 2023, 11, 549.