TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Dipartimento di Scienze e Tecnologie Chimiche

AVVISO DI SEMINARIO

La Prof.ssa Sibel A. Ozkan

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Il giorno 16/06/2026 alle ore 12.00

nell'Aula Gismondi

terrà un seminario dal titolo

The Future of Molecular Imprinting: Shaping Green and Innovative Electrochemical Platforms

Proponente: Prof.ssa Fabiana Arduini

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The Future of Molecular Imprinting: Shaping Green and Innovative Electrochemical Platforms

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Developing rapid, cost-effective, and "green" approaches to achieve environmental sustainability is currently one of the most important priorities for addressing environmental pollution.

Molecular imprinting technology is a creative method that enables synthetic biorecognition gaps to mimic natural biological derivatives such as antibodies, receptors, and enzymes. After removal of the target analyte, synthetic cavities enable recognition and selective rebinding of the template. In this case, molecular imprinting technology offers biosimilar receptors with higher specific affinity and greater stability than natural receptors and biomolecules [1]. Although stable and durable MIPs seem relatively easy to create to achieve maximum efficiency, some optimization parameters should be considered, such as the appropriate functional monomer and crosslinker, and the optimal ratios among functional monomer, template, and crosslinker [2].

Green analytical chemistry (GAC) aims to make analytical techniques less harmful to the environment and more human-friendly by reducing or eliminating toxic chemicals/reagents, using energy-efficient equipment, and using miniaturized and automated methods. Sustainability is the underlying approach to the GAC. There is an evolution towards more environmentally friendly components across the analysis process, from synthesis and analysis to the tools used. Thanks to these steps, minimizing waste generation and avoiding harmful waste will be the most important outcome of GAC for the environment and human health in the long run. It has been reported that template monomer interactions occur via noncovalent forces such as van der Waals forces, hydrogen bonds, and dipolar interactions [1, 2].

MIP-based electrochemical sensors and miniature electrochemical transducers can detect target analytes in situ. Thanks to their superior chemical and physical stability, low-cost manufacturing, high selectivity, and fast response, MIPs have recently become an interesting field of study. The increase in environmental awareness and stricter regulation for the use of chemicals and economic competitiveness are challenging the scientific community and industry to explore greener strategies in their processes, preventing pollution and reducing waste while maximizing the efficiency of the processes, and that can only be achieved by the application of green chemistry and engineering principles.

References

[1] L. Uzun, A.P.F. Turner, Molecularly-imprinted polymer sensors: realising their potential, Biosens. Bioelectron. 76 (2016) 131e144.

[2] S. Irem Kaya, Ahmet Cetinkaya, Sibel A. Ozkan, Molecularly imprinted polymers as highly selective sorbents in sample preparation techniques and their applications in environmental water analysis, Trends in Environmental Analytical Chemistry, 37, (2023), e00193.