

Molecular Imprinting: The “Supercritical” journey so far!



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Abstract

Molecularly Imprinted Polymers— MIPs— are robust, cost-effective affinity materials often referred to as “plastic antibodies.” During polymerization, it is possible to create affinity “pockets” within the cross-linked polymeric matrix that remain “frozen”, mimicking the size, shape, and chemical functionality of the target (template) molecule for which selectivity is desired.

Although the molecular imprinting process is conceptually simple and inexpensive—with many successful applications reported in the literature—widespread industrial implementation has yet to be achieved. One of the main barriers to commercialization is the difficulty of scaling up the process. Traditional MIP synthesis typically relies on organic solvents and yields hard polymer blocks that must be ground and sieved, followed by intensive drying and purification steps. These challenges make the process time-consuming and difficult for large-scale production.

The idea of combining polymerization in Supercritical Carbon Dioxide (scCO₂) and Molecular Imprinting brought new features to the process, taking advantage of the unique properties of this solvent, not only in terms of the process itself but also to the final MIP properties.

In this webinar, I will show you what is involved in the scCO₂-assisted molecularly imprinting process and its advantages, and showcase the development of MIPs for several applications, in a journey full of challenges and great collaborations.

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References

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