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הפקולטה להנדסה כימית
ע״ש וולפסון
The Wolfson Department of Chemical Engineering

Wolfson Department of Chemical Engineering Seminar

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Zoom

Photocatalytic enantiomeric enrichment of racemic mixtures of drugs by molecular imprinting

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MSc Seminar

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Enantiomeric separation, a critical process in the pharmaceutical and chemical industries, holds immense importance in the production of enantiopure drugs. Existing separation techniques such as chiral chromatography and stereoselective crystallization face limitations in terms of throughput generality, efficiency and selectivity. The research presented herein is based on a novel approach for enantiomeric separation developed by our group, via chiral molecular imprinting on a photocatalytic substrates. The proposed separation method involves adsorbing the undesired enantiomer, known as the distomer, onto the surface of a photoactive semiconductor, forming a chiral template. Following this, a non-photoactive layer is grown using atomic layer deposition (ALD) around the template, resulting in a chiral cavity. This unique configuration enables selective degradation of the distomer from a racemic solution, leading to enrichment of the desired enantiomer, known as the eutomer.

The primary objectives of this research are: (1) to study the generality of the method and its limitations by diversifying the number of separable chiral compounds, (2) to further enhance the selectivity of the separation process, and (3) to minimize the required reaction time. Here we present results with a model system comprising of a titania film as the photocatalyst, alumina as the inert layer and penicillamine as the target compound. The kinetics of the system were analysed using high-performance liquid chromatography (HPLC) to monitor the concentration of Penicillamine. The findings of this research hold significant potential in advancing the developing of an easily tunable, efficient and versatile enantiomeric separation method.