

*Compartmentalized MultiCatalysis:  
Chirality as Probe, Separation of Enantiomers & Catalytic Active Transport*

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Life solves the problem of different reaction conditions by the compartmentalization of the catalytic systems. This solution opens new opportunities for the chemists using synthetic membranes to isolate the catalytic systems.

We were interested to study the diffusion of molecules through a semi-permeable membrane when no gradient of concentration does exist. Chirality was found to be helpful to be used as probe to study such systems.<sup>1</sup> A scale of diffusion energy depending on the structure of the solute was established providing fruitful lessons.

Based on these results, compartmentalized multicatalytic systems were set up for different goals:

- A system where two catalysts of opposite configurations are working in each compartment leading to the physical separation of enantiomeric products starting from a racemic substrate. This is describing a case of compartmentalized parallel kinetic resolution (CPKR);<sup>2</sup>
- A system to promote the active transport of a molecule able to cross a membrane. The active transport means a transfer against the gradient of concentration.<sup>3</sup>

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<sup>1</sup> J. Hou, S. Chevallier-Michaud, L. Favre, D. Héroult & C. Bressy, *J. Membrane Sci.* **2026**, in revision.

<sup>2</sup> a) J. Hou, S. Chevallier-Michaud, M. Jean, L. Favre, D. Héroult & C. Bressy, *J. Am. Chem. Soc.* **2023**, *145*, 27236-27241; b) J. Hou, D. Héroult, C. Bressy, "Method for simultaneous preparation of separated enantiomeric products from racemic substrates", Extension internationale PCTEP2022085983 (**2022**) WO2023126186A1.

<sup>3</sup> Manuscript in preparation.