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Diffusiophoretic transport of colloids in porous media

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Gaining control over the motion of colloids in complex environments is essential in a wide range of applications, from cell sorting and drug delivery to filtration and water purification. Recent studies have demonstrated the utility of diffusiophoresis, ie, the motion of colloids due to solute gradients, in manipulating and steering colloids in simple microfluidic geometries. Yet, it remains a question whether diffusiophoresis could play an important role in more complex environments, with spatiotemporal gradients in solute gradients and flows. Here, combining experimental observations and numerical simulations of microfluidic channels patterned with obstacles, we study the competition between phoretic and convective migration of colloids and discuss its implications on the transport, dispersion, and steering of colloids on macroscopic length scales.

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References

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