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Self-diffusiophoresis of catalytically active patchy colloids near a solid boundary CHARLES MALDARELLI, ALI MOZAFFARI, Levich Institute, NIMA SHARIFI-MOOD, University of Pennsylvania, JOEL KOPLIK, Levich Institute — Active colloidal swimmers designed to move along an envisioned path to ascertain various applications in nanotechnology. In diffusiophoresis, gradients in the solute concentration across the colloid create an imbalance force due to the interactions of the solute with the particle. These forces can also be integrated into a self-propulsion by choosing a reactant as a solute which undergoes a surface reaction only on one face of a colloid. The effect of boundaries in self-diffusiophoresis is not purely to retard the motion, because the boundaries also alter the solutal gradient. We developed an analytical approach to investigate the dynamics of swimming colloid near an infinite planar wall assuming constant flux production and a repulsive interaction between product solute and the colloid. The motion of the colloid was decomposed into translational motions perpendicular and parallel to the wall and a rigid body rotation around the third axis. Our analysis indicates when a patchy colloid approaches the boundary with an inclination angle with respect to the unit normal of the wall, the asymmetric distribution of product around the colloid compels it to rotate and redirects its reaction section towards the wall and thereby the colloid will be moved away from the wall.

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