1163-35-92 **Claire E Plunkett*** (plunkett@math.utah.edu) and **Sean D Lawley**. *Boundary Homogenization for Trapping Rates of Two Patchy Objects.*

Many processes in chemical and biological physics involve two diffusing particles binding or a diffusing particle binding to a surface. It is often the case that one or both of the interacting surfaces are not uniformly reactive but instead have localized areas of reactivity. Mathematical models of such reactions take the form of a diffusion equation with mixed boundary conditions corresponding to the behavior of the heterogeneous or "patchy" surfaces. These models are commonly studied using boundary homogenization to replace the mixed boundary conditions by an effective uniform boundary condition identified by a single trapping rate parameter. In this work, we consider two patchy spherical particles and use a quasi-chemical formalism to derive a simple analytical approximation for the trapping rate as a function of the reactive surface area fractions and the homogenized trapping rates of each particle in the case of small areas of reactivity. We confirm this result by using matched asymptotic analysis to formally derive the homogenized trapping rate for two patchy particles as well as applying and confirming our result for the system of a patchy sphere and a patchy plane. We further verify this result through numerical calculations via kinetic Monte Carlo algorithms. (Received August 13, 2020)