Instructions: Use whatever format you would like to work on this assignment, but include in the filename *the number of this quiz (i.e., 02) and your last name*.

<u>Transport</u>

1) The article that you read in preparation for this discussion section (available here: https://pubs.acs.org/doi/10.1021/acsami.0c12686) described a continuity of mass relation for each species in the system. Yet, I did not see the equation we discussed in lecture section; please explain.

2) Prove that transport can be described as a chemical reaction of $A^-{}_{z_1}$ transporting to $A^-{}_{z_2}$. First write the equation for the flux of A^-, N_{A^-}, in one dimension, z; then convert it from an areal transport rate into a volumetric rate by taking the derivative in space, $\frac{\partial}{\partial z}$, and multiplying it by -1; then assume that the distance is small so that you can approximate all spatial derivatives, ∂z, as a fixed small distance, ℓ; and lastly, rearrange the equation into the sum of 3 general mass action terms, to prove to yourself that transport can be written as chemical reactions. Based on this outcome, determine the value of each rate constant in terms of the diffusion coefficient, effective force field(s), and constants.