Dielectric effects on the ion distribution near a Janus colloid
HUANXIN WU, MING HAN, ERIK LUIJTEN, Northwestern University — Spherical Janus colloids, particles with two domains of different materials, are typically heterogeneous in permittivity. This dielectric heterogeneity will influence their behavior in electrolytes, ranging from their aggregation to their electrokinetics in external fields. We investigate the structure of the electric double layer around spherical Janus colloids immersed in solution via molecular dynamics simulations. Polarization of the colloidal surfaces by the surrounding ions is calculated dynamically with a boundary-element method based Poisson solver. One observation is that even neutral Janus colloids may carry a net dipole moment in the presence of asymmetric salts. Moreover, we extend this study to incorporate a spatially varying permittivity of the solvent near a charged Janus colloid, and demonstrate the effect of this dielectric variation on the electric double layer.