Abstract

Electrodynamics of Colloidal Nanoparticles in Non-polar Solvents

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The mass conservation equation for colloidal particles in nonpolar solvents is used to study the deposition of nanoparticles onto electrodes during electrophoretic deposition. We determined the flux of nanoparticles as a function of the drift velocity and dispersion coefficient subject to the boundary conditions. The flux of the particles onto the electrode is simulated using boundary conditions that are based on: i) the Langmuir adsorption isotherm and ii) the mass transfer coefficient. We determined optimum conditions for the deposition of nanoparticles onto the electrodes and the electrophoretic mobility under various conditions.