

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Contact line moving over a sinking sphere SEONG JIN KIM, JIM AN, Virginia Tech, KAMEL FEZZAA, TAO SUN, Argonne National Laboratory, SUNGHWAN JUNG, Virginia Tech — Spreading dynamics of a contact line over a sinking sphere with a constant speed into a liquid reservoir are studied both experimentally and theoretically. A high-speed camera system with X-ray illumination is employed to accurately characterize contact line motions. Over a range of Reynolds number from 30 to 1000, the spreading speed of the contact line is linearly dependent on the sinking speed of the sphere. A simple scaling equation from the force balance between the drag-induced pressure and inertia agrees with the experimental results. In addition, the numerical solution of Navier-Stokes equation, showing pressure distribution and streamline near the sinking sphere, validates our scaling equation.

Seong Jin Kim
Virginia Tech

Date submitted: 28 Jul 2015

Electronic form version 1.4