Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Sinking of a sphere into viscous liquid DUCK-GYU LEE, HO-YOUNG KIM, Seoul National University — A dense solid sphere gently released on an air-liquid interface slowly sinks into the liquid due to gravity while the motion is resisted by liquid viscosity and interfacial tension. We study the sinking velocity of the sphere both theoretically and experimentally. The viscous drag force on the sphere is determined by solving the Stokes equation. To find the retarding force due to interfacial tension, we obtain the meniscus profile by solving the dynamic boundary condition that relates the jump of normal stresses across the air-liquid interface to the surface tension. The predicted sinking velocity, a function of the sphere density and radius, liquid density, viscosity and surface tension, and the dynamic contact angle, is in good agreement with the experimental measurements. The current work expands our knowledge of the sinking process of small spheres which mainly concerned the sinking of completely immersed spheres so far.

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Date submitted: 06 Aug 2009 Electronic form version 1.4