Abstract Submitted
for the APR15 Meeting of
The American Physical Society

Generation of the sedimentation potential by rapid deceleration
of a fluid jet HAN JUNG PARK, University of Tennessee at Chattanooga, ZIYAO
TANG, GERALD DIEBOLD, Brown University, UNIVERSITY OF TENNESSEE
AT CHATTANOOGA TEAM, BROWN UNIVERSITY TEAM — The sedimenta-
tion potential refers to the generation of a voltage in an ionic or colloidal solution
as a result of motion of the ions or colloidal particles relative to the surrounding
fluid. In the case of colloidal suspensions, where the density of the colloidal par-
ticles differs from that of the fluid, the effect of a body force on the suspension,
generated typically either in a centrifuge or the earth’s gravitational field, is to give
different motion to the charged particles and the fluid, producing a distortion of the
normally spherical counter charge distribution around the colloidal particles. As a
result of the opposing charges attached to the particles and in the double layer in
the surrounding fluid, dipoles are generated at the sites of the particles, which add
to give a macroscopic voltage in the fluid. Experiments reported here show that the
sedimentation potential can be generated by the rapid deceleration of a jet of colloid
at a rigid surface where, again, the differential acceleration of the particles and fluid
gives rise to a voltage. The voltages between a conducting surface and a metallic
tube used to form the jet are found to have large signal-to-noise ratios. Park et al.
JOURNAL OF APPLIED PHYSICS 116, 104908 (2014)

Han Jung Park
University of Tennessee at Chattanooga

Date submitted: 03 Dec 2014

Electronic form version 1.4