

Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Retreating behavior of a charged ionic liquid droplet in a dielectric liquid under electric field¹ MYUNG MO AHN, DO JIN IM, IN SEOK KANG, POSTECH, Pohang, Gyeongbuk, South Korea — Ionic liquids show great promise as excellent solvents or catalysts in energy and biological fields due to their unique chemical and physical properties. The ionic liquid droplets in microfluidic systems can also be used as a potential platform for chemical biological reactions. In order to control electrically the ionic liquid droplets in a microfluidic device, the charging characteristics of ionic liquid droplets need to be understood. In this work, the charging characteristics of various ionic liquids are investigated by using the parallel plate electrodes system. Under normal situation, a charged droplet shows bouncing motion between electrodes continuously. However, for some special ionic liquids, interesting retreating behavior of charged ionic liquid droplet has been observed. This retreating behavior of ionic liquid droplet has been analyzed experimentally by the image analysis and the electrometer signal analysis. Based on the hypothesis of charge leakage of the retreating ionic liquid droplets, FT-IR spectroscopy analysis has also been performed. The retreating behavior of ionic liquid droplet is discussed from the intermolecular point of view according to the species of ionic liquids.

¹This research was supported by grant No. 2013R1A1A2011956 funded by the Ministry of Science, ICT and Future Planning (MSIP) and by grant No. 2013R1A1A2010483 funded by the Ministry of Education, Science and Technology (MEST) through the NRF.

Myung Mo Ahn
POSTECH, Pohang, Gyeongbuk, South Korea

Date submitted: 02 Aug 2013

Electronic form version 1.4