

Abstract Submitted
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Properties of Ion Irradiation to Plasma-Ionic Liquid Interface Relating to Metals Nanoparticle Synthesis¹ TAKASHI HARADA, KAZUHIKO BABA, TOSHIRO KANEKO, RIKIZO HATAKEYAMA, Department of Electronic Engineering, Tohoku University — We investigate basic physics of gas-liquid interfacial discharge plasmas under low gas pressures and effects of ion irradiation to ionic liquids as an electrode on the gold (Au) and platinum (Pt) nanoparticle synthesis by a plasma-reduction method. We successfully measure the Paschen curves using the ionic liquid as a cathode and an anode. We also measure electrostatic potentials in the ionic liquid and the gas phase plasma, and investigate a change of the potential formation which determines the ion irradiation energy E_i . The Au or Pt nanoparticles can be synthesized using the ionic liquids as a cathode, i.e., ion irradiation on the ionic liquids. It is found that the larger E_i enhances the amount of the synthesized Au nanoparticles. In addition, the nanoparticles can be synthesized in a shorter time compared with the case using the ionic liquid as the anode. The Pt nanoparticles are synthesized only by the ion irradiation. Based on these results, it is suggested that the ion irradiation to the ionic liquid is essential to synthesize the metal nanoparticles.

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Takashi Harada
Department of Electronic Engineering, Tohoku University

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