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On The Possibility of Preferential Reactions at Plasma-Liquid Interface Due To Electric Double Layer¹ TATSURU SHIRAFUJI, Osaka City University, FUMIYOSHI TOCHIKUBO, Tokyo Metropolitan University — Plasmas in and in contact with liquid have attracted much attention because of their possible application fields such as nano materials synthesis, surface modification, water treatment, sterilization, recycling of rare materials, and decomposition of toxic compounds. The most important part in the plasmas in contact with liquid is the interface between the gas-phase plasma and liquid. According to electrochemistry, a nano-scale electric double layer (EDL) is formed on the top surface of the liquid. Thus, in a plasma treatment of liquid medium, gas-phase active species in the plasma primarily encounter the liquid-phase species in the EDL. For the purpose of precise control of plasmas in contact with liquid, we must pay attention to the formation and behavior of the EDL. In this work, numerical simulation of the EDL in contact with a dielectric barrier discharge has been performed. Preferential appearance of positive or negative ions has been observed on the top surface of the liquid depending on the mass ratio of the positive and negative ions in the liquid, and on the frequency applied. This means that the preferential reactions can be realized between gas-phase plasma species and liquid phase ions.

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