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Change in discharge current of atmospheric-pressure helium glow discharge by photo-excited desolvation of hydrated electrons YOSHINOBU INAGAKI, KOICHI SASAKI, Hokkaido University — Hydrated electrons are generated by plasma-liquid interaction. However, there have been limited reports on the detection of hydrated electrons in liquids interacting with plasmas. The difficulty is caused by the fact that hydrated electrons generated by the plasma irradiation are localized in a narrow region with a thickness of several nanometers below the plasma-liquid interface. To overcome the difficulty, in this work, we developed a new method to detect hydrated electrons in the interfacial region. Hydrated electrons in the interfacial region are converted to free electrons when they are irradiated with laser beam having a photon energy exceeding the desolvation energy. Free electrons produced by the desolvation are ejected into the gas phase. In the experiment, we used an atmospheric-pressure helium glow discharge with a liquid electrode, and measured the temporal variation of the discharge current when the liquid electrode was irradiated with the Nd:YAG laser pulse at a wavelength of 266nm. As a result, we observed the increase in the discharge current at the timing of the pulsed laser irradiation, which may be due to the ejection of free electrons produced by the desolvation of hydrated electrons.

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