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Spectral analysis of optical emission of microplasma in sea water.[1]
VLADISLAV GAMALEEV, HAYATO MORITA, JUN-SEOK OH, HIROSHI FURUTA, AKIMITSU HATTA, Kochi University of Technology — This work presents an analysis of optical emission spectra from microplasma in three types of liquid, namely artificial sea water composed of 10 typical agents (10ASW), reference solutions each containing a single agent (NaCl, $MgCl_2$+H_2O, Na_2SO_4, $CaCl_2$, KCl, $NaHCO_3$, KBr, $NaHCO_3$, H_3BO_3, $SrCl_2$+H_2O, NaF) and naturally sampled deep sea water (DSW). Microplasma was operated using a needle(Pd)-to-plate(Pt) electrode system sunk into each liquid in a quartz cuvette. The radius of the tip of the needle was 50μm and the gap between the electrodes was set at 20μm. An inpulse generator circuit, consisting of a MOSFET switch, a capacitor, an inductor and the resistance of the liquid between the electrodes, was used as a pulse current source for operation of discharges. In the spectra, the emission peaks for the main components of sea water and contaminants from the electrodes were detected. Spectra for reference solutions were examined to enable the identification of unassigned peaks in the spectra for sea water. Analysis of the Stark broadening of Hα peak was carried out to estimate the electron density of the plasma under various conditions. The characteristics of microplasma discharge in sea water and the analysis of the optical emission spectra will be presented.

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