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Time-resolved Optical Emission Spectroscopy on DBD of Ar Gas in Contact with Water KAZUHIKO OBANA, KENJI TANAKA, TATSURU SHIRAFUJI, Osaka City University — Recently, we have proposed three-dimensionally integrated micro-solution plasma (3D IMSP) to perform plasma treatment on a large amount of aqueous solution. In a 3D IMSP reactor, many microplasmas are generated in a porous dielectric material filled with a gas-liquid mixed medium. Time-resolved optical emission spectroscopy (OES) on 3D IMSP has revealed that the emission intensity of OH (A-X) shows unique and interesting behavior as a function of time. The OES data, however, are not those for one bubble but are averages for spatially distributed bubbles. To improve the performance of 3D IMSP, we should understand the details of plasma in one bubble. We have hence investigated the plasma generated in a simple reactor that is considered to have an environment equivalent to one bubble in 3D IMSP. The reactor has a configuration to drive dielectric barrier discharge (DBD) of Ar gas in contact with water, on which we have performed OES. The OES results have shown that the optical emission of OH (A-X) lasts longer than that of Ar. We discuss its possible mechanisms together with numerical simulation of the DBD and detailed analysis of the spectral profiles of the OH (A-X) emission.

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