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Removal of volatile organic compounds in the confined space using atmospheric pressure discharge plasmas Y. MATSUOKA, Y. KIKUCHI, N. FUKUMOTO, M. NAGATA, University of Hyogo, T. TOYOURA, M. MATSUI, T. KISHIMOTO, Kawasaki Heavy Industries, Ltd. — Volatile organic compounds (VOCs) are regulated as hazardous pollutants. Thus, the control of VOCs in the atmosphere is one of the most important environmental problems. Removal of VOCs has been generally carried out by conventional methods such as absorption, adsorption and incineration. There are some researches on development of removal system using atmospheric pressure discharge plasmas. In this study, the plasma process is applied to removal of VOCs in the confined space such as an underwater vehicle because of low operating temperature and compact system. A copper wire is helically wound outside a glass tube, and a tungsten rod is inserted inside the glass tube. A dielectric barrier discharge (DBD) plasma is produced inside the glass tube by a high-voltage bipolar power supply for the removal of VOC. The DBD plasma decomposed hexane with the initial concentration of 30 ppm diluted by nitrogen, air and humid air. As the result, the removal efficiency of hexane diluted by nitrogen, air and humid air was 15%, 45% and 80%, respectively. Thus, it is considered that O and OH radicals are effective for removal of hexane. Optimization of the electrodes and the applied voltage waveforms for the enhancement of removal efficiency and the reduction of second products such as ozone will be investigated.

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