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Time-resolved OES measurement of microwave plasma produced inside controlled bubbles under water[1] TATSUO ISHIJIMA, HARUKA SUZUKI, HIROTAKA TOYODA, Nagoya University — Plasma generation inside bubbles under liquid has been given much attention because of its potential industrial applications such as water purification, sterilization, materials processing and so on. In our previous study, we have demonstrated that liquid temperature and operating pressure have great influences on the plasma production and decomposition of organic solutes in de-ionized water. However, physical and chemical processes occurring inside the bubbles are still unclear because the plasma is not produced under well-defined experimental conditions. In this work, we have developed a microwave bubble plasma system where reproducible microwave plasma is produced inside size-controlled bubbles. With the aid of this system, temporal variations of He I emission from discharge gas and H or OH emission from water vapor are measured by time-resolved photon-counting technique. After the plasma ignition, He I intensity rapidly increases within less than 100 ns. However, OH and H intensities increase $\sim$1 μs after the plasma ignition. This result suggests that the water vapor is produced by the plasma irradiation on the bubble surface.

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