Diagnostics of capacitively-coupled hydrocarbon plasmas for deposition of diamond-like carbon films using quadrupole mass spectrometry and Langmuir probe\textsuperscript{1} Akinori Oda, Faculty of Engineering, Chiba Institute of Technology, Shun Fukai, Graduate School of Engineering, Chiba Institute of Technology, Hiroyuki Kousaka, Graduate School of Engineering, Nagoya University, Takayuki Ohta, Faculty of Engineering, Meijo University — Diamond-like carbon (DLC) films are the hydrogenated amorphous carbon films, which contains a mixture of sp\textsuperscript{2}- and sp\textsuperscript{3}-bonded carbon. The DLC films have been widely used for various applications, such as automotive, semiconductors, medical devices, since have excellent material properties in lower friction, higher chemical stability, higher hardness, higher wear resistance. Until now, numerous investigations on the DLC films using plasma assisted chemical vapor deposition have been done. For precise control of coating technique of DLC films, it is enormously important to clarify the fundamental properties in hydrocarbon plasmas, as a source of hydrocarbon ions and radicals. In this paper, the fundamental properties in a low pressure radio-frequency hydrocarbon (Ar/CH\textsubscript{4}(1 \%) gas mixture) plasmas have been diagnosed using a quadrupole mass spectrometer (HIDEN ANALYTICAL Ltd., EQP-300) and Langmuir probe system (HIDEN ANALYTICAL Ltd., ESPion).

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