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Production of carbonaceous particulates by interaction between a graphite plate and high-density hydrogen plasmas K. SASAKI, T. MAEDA, N. TAKADA, M. ARAMAKI, Nagoya University, Japan, K. SHIBAGAKI, Suzuka National College of Technology, Japan — This work is a simulation experiment for the divertor region of a nuclear fusion reactor. A graphite plate was irradiated by high-density hydrogen plasmas produced by helicon-wave discharges. The helicon source was a linear machine with uniform magnetic field, by which the high-density plasma column was confined radially. It was observed by the naked eye that the surface of the graphite plate was changed by the irradiation of the plasma column. The close observation using a secondary electron microscope indicated the formation of many particulates with diameters less than 10 μm. The diameter and the density of particulates were dependent on the radial position. The sources for the formation of particulates may be hydrocarbon and carbonic radicals produced by the interaction between the high- density H_2 plasma and the graphite plate. By considering the setting of the helicon source, it is speculated that the growth of particulates occurs on the surface of the graphite plate. We adopted laser-desorption time-of-flight mass spectrometry for analyzing carbonaceous particulates. As a result, we found that H atoms were included in carbonaceous particulates, which is a critical problem from the viewpoint of safety hazards such as tritium inventory in D-T nuclear fusion reactors.

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