

Abstract Submitted
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Diagnostics of plasma reaction fields in supercritical fluid by using micro-Raman spectroscopy TAKAAKI TOMAI, HIROKAZU KIKUCHI, KOYA SAITO, The University of Tokyo, HIROHARU YUI, Science University of Tokyo, KAZUO TERASHIMA, The University of Tokyo — Supercritical fluid (SCF) is a promising medium, which has superior transport properties, such as liquid-like high density and gas-like high diffusivity. Recently, discharge plasma generated in SCF has attracted much attention as extremely high reaction field. In previous study, it was found that carbon nanostructured materials, such as carbon nanotubes, can be synthesized effectively from supercritical CO₂ near the critical point. In this study, to verify the existence of characteristic microstructures of SCF, we diagnose the molecular clustering and density fluctuation in barrier discharge plasma reaction fields by micro-Raman spectroscopy. It was found that the decrease in the density of CO₂ during plasma generation is less than 0.02 g/cm³ (the critical density of CO₂: 0.467 g/cm³), as compared with that in the case of the neat CO₂, for wide pressure ranges from gaseous to supercritical conditions. Moreover, it was experimentally verified that the density fluctuation observed near the critical point persists in the plasma reaction field. We will present the further detail with the results of other supercritical medium, CHF₃, in addition to CO₂, at 61st Gaseous Electronics Conference (GEC).

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