

Abstract Submitted  
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**Plasma discharge characteristics in compact SF<sub>6</sub> radio-frequency plasma source for plasma etching application** TAISEI MOTOMURA, AIST, KAZUNORI TAKAHASHI, Tohoku Univ., YUJI KASASHIMA, FUMIHIKO UESUGI, AIST, AKIRA ANDO, Tohoku Univ. — In order to create a compact plasma etching reactor, plasma discharge characteristics in compact SF<sub>6</sub> radio-frequency (RF) plasma source which has a chamber diameter of 40 mm have been studied. Convergent magnetic field configuration produced by a solenoid coil and a permanent magnet located behind substrate is employed for efficient plasma transport downstream of plasma source. A discharge characteristics with the changes in relative emission intensity of fluorine atom of FI at 703.7 nm in compact SF<sub>6</sub> plasma source are discussed: the dependence of relative emission intensity on the magnetic field strength, the RF input power, and the mass flow rate of the SF<sub>6</sub> gas. The relative emission intensity was significantly increased when the RF input power is ~150 W. We present the fundamental etching performance (especially etching rate) of compact plasma source, and then the etching rate of 0.1-1.0 μm/min was obtained under the condition of a RF input power of 50-200 W, a mass flow rate of SF<sub>6</sub> of 5.5 sccm and a bias RF power of 20 W. The results of test etching will be shown in presentation.

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