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Many flaked particles generated by electric field stress working as an impulsive force in mass-production plasma etching equipment¹ YUJI KASASHIMA, FUMIHIKO UESUGI, National Institute of Advanced Industrial Science and Technology (AIST) — Particles generated in plasma etching significantly lower production yield. In plasma etching, etching reaction products adhere to the inner chamber walls, gradually forming films, and particles are generated by flaking of the deposited films due to electric field stress that acts boundary between the inner wall and the film. In this study, we have investigated the mechanism of instantaneous generation of many flaked particles using the mass-production reactive ion etching equipment. Particles, which flake off from the films on the ground electrode, are detected by the in-situ particle monitoring system using a sheet-shaped laser beam. The results indicate that the deposited films are severely damaged and flake off as numerous particles when the floating potential at the inner wall suddenly changes. This is because the rapid change in floating potential, observed when unusual wafer movement and micro-arc discharge occur, causes electric field stress working as an impulsive force. The films are easily detached by the impulsive force and many flaked particles are instantaneously generated. This mechanism can occur on not only a ground electrode but a chamber walls, and cause serious contamination in mass-production line.

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