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Investigation of Dusts Effect and Negative Ion in DC Plasmas by Electric Probes HYE TAEK OH, INJE KANG, MIN-KEUN BAE, INSUN PARK, SEUNGHWA LEE, SEJIN JEONG, KYU-SUN CHUNG, Department of Electrical Engineering, Hanyang University — Dust is typically negatively charged by electron attachment whose thermal velocities are fast compared to that of the heavier ions. The negatively charged particles can play a role of negative ions which affect the quasi-neutrality of background plasma. To investigate effect of metal dusts and negative ion on plasma and materials, metal dusts are injected into background Ar plasma which is generated by tungsten filament using dust dispenser on Cubical Plasma Device (CPD). The CPD has following conditions: size=24x24x24cm³, plasma source=DC filament plasma ($n_e \approx 1 \times 10^{10}$, $T_e \approx 2\text{eV}$), background gas=Ar, dusts=tungsten powder (diameter $\approx 1.89\mu\text{m}$). The dust dispenser is developed to quantitate of metal dust by ultrasonic transducer. Electronegative plasmas are generated by adding O₂+ Ar plasma to compare negative ion and dust effect. A few grams of micron-sized dusts are placed in the dust dispenser which is located at the upper side of the Cubical Plasma Device. The falling particles by dust dispenser are mainly charged up by the collection of the background plasma. The change in parameters due to negative ion production are characterized by measuring the floating and plasma potential, electron temperature and negative ion density using electric probes.

Hye Taek Oh
Department of Electrical Engineering, Hanyang University

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