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Ion Wind Generation and its Application to Cooling Device[1]
BUMCHANG KIM, SANGHYUN LEE, Pohang University of Science and Technology (POSTECH), YOU SEOP LEE, Samsung Electronics, KWAN HYOUNG KANG, Pohang University of Science and Technology (POSTECH) — Ion wind generation (IWG) has a long history in the field of electrohydrodynamics (EHD). The application of IWG to cooling devices has drawn much attention, mainly because of its extremely low level of acoustic noise emission, compared to the conventional mechanical fan. In this work, we performed a parametric study for geometrical and electrical configurations, electrode materials, and surrounding media such as air, nitrogen, and argon. Wind velocity and volume flow rate are measured with regard to power efficiency, operational voltages, and polarities such as DC+, DC-, and AC. The effect of electrode materials and the surrounding media on the morphological changes of the electrode surface is discussed. This study envisions that the IWG could be a promising cooling mechanism, although there are several issues such as safety and maintenance that need to be addressed.

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