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Direct patterning using aerodynamically assisted electrohydrodynamic jet printing[1] SANGYEON HWANG, BAEKHOON SEONG, WONYOUNG LEE, DOYOUNG BYUN, Sungkyunkwan Univ — Electrical force and aerodynamic force are considered to be preferred sources for generating a liquid jet to emit the target fluid on a tiny scale. The former is known as an electrohydrodynamic (EHD) jet, while the latter is called flow focusing. Here, we report the effect of a combined energy source on the micro scale jet and patterns and investigate the scaling law of pattern width according to the ratio of two energy sources. In a conventional EHD jet, after a short length of straight section the charged viscous jet turns into complex shape which occurs difficulty in patterning fine lines. A coaxially driven gas stream smoothed the asymmetric jet lengthening the straight section of the jet. The jet could be issued constantly within the range that did not exceed the stable region in the parametric space. Under such stable conditions, the jet became narrow as compared to the one from the normal EHD jet. Hence, the patterns formed at a high gas pressure were noticeably smaller than the others, demonstrating the controllability of jet thickness. Various liquids had been used as the target fluids to investigate the effect of liquid properties.

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