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The Minimum Flow Rate Scaling in Taylor Cone-Jets WILLIAM SCHEIDELER, CHUAN-HUA CHEN, Duke University — A minimum flow rate is required to maintain steady electrohydrodynamic Taylor cone-jets, and is empirically known to be inversely proportional to the electrical conductivity of the working fluid in the electrospraying literature. Here, we show that this scaling law governed by the charge relaxation process is only applicable to low-viscosity liquids. At higher viscosities, the minimum flow rate is governed by the capillary-inertial process and exhibits a strong dependence on the nozzle diameter instead of the liquid conductivity. The two scaling laws are demarcated by the Ohnesorge number based on the nozzle diameter.

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