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Breakup of carbon nanotube aggregates in microfluidic traps STEVEN HUDSON, PAUL START, ERIK HOBBIE, KALMAN MIGLER, NIST, Gaithersburg, MD 20899 — The critical stress to break aggregates of multiwalled-carbon nanotubes suspended in low-molecular-weight polyisobutylene has been measured in planar elongational flow, produced in a microfluidic device. Through image analysis of aggregates and their fragments, the extension rate of the flow and the size and aspect ratio of the aggregates are measured in real time. While trapping an aggregate at the stagnation point of the planar elongational flow, the flow rate is continually increased, and breaking events are recorded, establishing a correlation of aggregate size and stress. In turn, the number of tubes within an aggregate, estimated from fractal geometry, is approximately proportional to stress$^{-0.66}$. We compare these measurements with clustering and breakup data in simple shear.

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