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Foams for Microfluidics JAN-PAUL RAVEN, PHILIPPE MARMOTTANT, FRANÇOIS GRANER, Laboratoire de Spectrométrie Physique — We present an experimental investigation of the assembly of microbubbles into a 2D foam and its flow in microchannels. Using a flow focusing method, we can produce a foam *in situ* on a microfluidic chip for a large range of liquid fractions. We study its flow dissipation along a channel, and the effect of constrictions. Microscopic imaging allows monitoring the transition from separated bubbles into the desired foam in which bubbles are closely packed. The foam flowrate depends non-linearly on the applied pressure, displaying a threshold pressure due to capillarity. The measurements are made in a channel with a height of 250 μm, resulting in bubbles whose height to diameter aspect ratio ranges between 0.3 and 1. We also produce an ultraflat foam (reducing the channel height to about 8 μm) with a bubble aspect ratio down to 0.02; we observe a marked change in bubble shape during the flow. The control of microfoam flows provides possible applications like transporting amphiphilic molecules on interfaces or the individual handling of gas pockets.

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