Filtering Algae and Macromolecules Using PDMS Frits

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Microalgae is one of the best biofuel candidates due to its ease of growth in many water environments, high lipid content, and lack of overlap with food production. The separation of microalgae from water is the most difficult part of the process. A possible solution for this is microfluidic frits. These frits are made using magnesium powder in PDMS and then dissolving the magnesium. By varying the ratio of magnesium to PDMS, magnesium size, and the applied pressure, the filtering capabilities of the frit can be changed and controlled. The frit is tested in a two piece, 3D printed device with pressure being applied by a syringe pump. The data show that the algae is being filtered effectively. I am continuing to test the frits with new magnesium ratios and multiple layers to filter better and faster. The frits have also been tested in macromolecule separation, which is necessary in many settings, like the medical field. However, frits optimized for microalgae have poor macromolecule separation capabilities.

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