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Biomedical Engineering

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## **Protocol Oil and Continuous Phase for polyacrylamide droplets**

This is a protocol for the production of the oil and continuous phase used in the microfluidic droplet device. It has been composed with the use of scientific resources and improved by trial and error during the experiments.

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## 1 Oil Phase

- TEMED (catalyst of polymerization reaction) 0.53% v/v in HFE-7500.
- Fluorosurfactant (reduction of interfacial tension) 3.0% m/m in HFE-7500, which equals 4.1% v/v in HFE-7500.
- For 5 mL oil phase:
  - First add 4779  $\mu\text{L}$  HFE-7500 to a falcon tube.
  - Then 25.3  $\mu\text{L}$  TEMED.
  - Finally 196  $\mu\text{L}$  fluorosurfactant.

## 2 Continuous Phase

- Acrylamide:N,N'-methylenebisacrylamide-solution (60%, 37.5:1) 4.0% v/v (of acrylamide) in water. Thus 0.11% v/v methylenebisacrylamide (cross-linker).
- Ammonium persulfate (initiator) 13% m/m in water.
- For 1 mL water phase:
  - First weigh 100 mg ammonium persulfate (APS) en transfer it to an eppendorf tube.
  - Fill the eppendorf tube with 932  $\mu\text{L}$  water.
  - Finally, add 68.4  $\mu\text{L}$  acrylamide:N,N'-methylenebisacrylamide-solution (60% solution).

## 3 References

Fang, D., Li, Y., Meng, X., Wu, J. (2014). Liquid density of HFE-7200 and HFE-7500 from  $T = (283 \text{ to } 363) \text{ K}$  at pressures up to 100 MPa. *The Journal of Chemical Thermodynamics*, 69, pp. 36-42.

Fernandez-Nieves, A., Wyss, H., Mattsson, J., Weitz D.A. (2011). *Microgel Suspensions: Fundamentals and Applications*. John Wiley & Sons. Chapter 3: New Functional Microgels from Microfluidics.