University of Stuttgart
Institute of Physical Chemistry

**Monday, Mai 16, 2022**
**4:00 pm – 5:00 pm**

## Colloquium of the Institute of Physical Chemistry


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# Nanostructured Fluid-Bicontinuous Gels for Energy Efficient Molecular Separations

Fluid-bicontinuous gels are unique materials that allow two distinct fluids to interact through a percolating, rigid scaffold (Figure 1).[1] Current restrictions for their use are the large fluid-channel sizes (>5 µm), limiting the fluid–fluid interaction surface-area, and the inability to flow liquids through the channels.[2] In this work a scalable synthesis route of nanoparticle stabilized fluid-bicontinuous gels with channels sizes below 500 nm and specific surface areas of 2 $m^2$ $cm^{-3}$ is introduced.[3] Moreover, it is demonstrated that liquids can be pumped through the fluid-bicontinuous gels. The fast liquid flow in the fluid-bicontinuous gel facilitates their use for molecular separations in continuous-flow liquid–liquid extraction. Together with the high surface areas, liquid flow through fluid-bicontinuous gels enhances their potential as highly permeable porous materials with possible uses as microreaction media, fuel-cell components, and separation membranes.

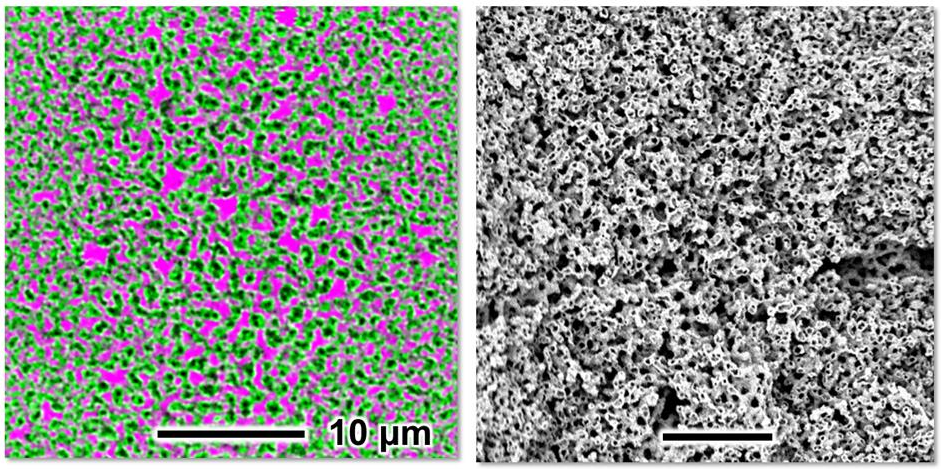


**Figure 1:** Left: confocal microscopy shows that the fluid bicontinuous gel is composed of oil (black), water (magenta) and ultra-thin layer of nanoparticles (green). Right: a scanning electron microscopy image reveals the small channels.


[1] Stratford, Kevin, et al., Science 309.5744 (2005): 2198-2201.
[2] Haase, Martin F., Kathleen J. Stebe, and Daeyeon Lee, Advanced Materials 27.44 (2015): 7065-7071.
[3] Khan, Mohd A., et al., Advanced Materials (2022): 2109547.


**Lecture hall:** V55.21 (Pfaffenwaldring 55, 70569 Stuttgart)

**Online meeting link:** https://kurzelinks.de/ipc-colloquium

**Number:** 2732 613 7645

**Password:** 3ZdPRM3XhV8

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