

# Materials for Functional Liquid Wettability

Uttam Manna\*

*Department of Chemistry and Centre for Nanotechnology*

*Indian Institute of Technology Guwahati,*

*Guwahati, Assam-781039*

[Email: umanna@iitg.ac.in](mailto:umanna@iitg.ac.in)

The nature-inspired wettabilities that either extremely repelled or allowed effortless sliding of different liquids (oil/water) in air or underwater are with immense potential for various prospective applications. In common practice, essential chemistry and appropriate topography that conferred the special liquid wettabilities were mostly and generally achieved by associating delicate chemistry. Eventually, the synthesized materials suffered from poor durability issues. In the literature, very few designs are capable of providing durable bio-inspired wettability—but fabrication processes remain generally complex. Moreover, the integration of various other relevant physical properties with such durable liquid wettability is highly challenging to achieve. Hence, design of robust bio-inspired liquid wettability following a simple fabrication process that would allow to integrate different and relevant physical properties is utmost important for various fundamental and applied contexts. Related to this, recently, our research group has extended 1,4 conjugate addition reactions between amine and acrylates at ambient conditions to develop tolerant and functional liquid wettability.<sup>1-10</sup> The controlled tailoring of different bio-inspired liquid wettability from the porous and chemically reactive interfaces—following strategic post modulation of the chemically reactive interfaces will be discussed in this invited lecture. A strategic association of adequate crosslinkers can provide a highly tolerant and hard superhydrophobic coating on geometrically complex and soft materials. Such a simple chemical approach also allowed to reveal important fundamental aspects related to different bio-inspired wettability. In this presentation, design of a rewritable and liquid-selective wettability pattern will be discussed in details.<sup>3</sup>

## References

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## **Prof. Uttam Manna, FRSC**



### **short biography**

Prof. Uttam Manna, Fellow of Royal Society of Chemistry (FRSC), is currently a professor at Department of Chemistry—and also affiliated with Centre for Nanotechnology in Indian Institute of Technology, Guwahati (IITG). He completed his Integrated PhD from IISc Bangalore in 2011. He pursued his post-doctoral research from University of Wisconsin-Madison, USA. He is recognized as an emerging investigator by Journal of Materials Chemistry A (2018), Chemical Communications (2020), Nanoscale (2021) and Chemical Society Reviews (2022). In 2023, Chemical Communications journal also recognized him as a pioneering investigator. He received the CRSI Bronze Medal for the year 2023. He is also a recipient of the Humboldt Research Fellowship for Experienced Researchers in 2021. He became International Excellent Fellow of KIT, Germany in 2024.

**<https://uttammannaiitg.wixsite.com/polymericlab>**

### **summary of your research interests**

His research team is interested in designing functional and durable coatings embedded with bio-inspired wettability through the strategic association of robust and facile chemical approaches for energy, environment and health related different applications—including efficient oil/water separation, improving performance of water splitting, self-cleaning, chemical sensing, programmed release of small molecule, anticounterfeiting, no-loss liquid transport, strain sensing, joule heating etc.