

A SCALABLE PLATFORM FOR FUNCTIONAL NANOMATERIALS

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Bubble bursting at interfaces plays an important role in a spectrum of physical and biological phenomena, from foam evolution to mass transport across various interfaces¹⁻⁵. Recently, bubble bursting at an air/oil/water-with-surfactant compound interface was found to disperse submicrometer oil droplets into the water column⁶. Inspired by this observation, here we propose a new top-down platform to generate functional oil-in-water nanoemulsions. We demonstrate scaled-up synthesis of nanoemulsions with stability for days, which offers the flexibility of further treatments and functionalization. By placing functional materials in the appropriate phase, we also document that the bubbling system has the capability to produce nanoemulsions encapsulating functional materials, such as quantum dots, silica nanoparticles and lipid molecules. Considering the simplicity and energy efficiency of the new bubbling platform, together with the diversity of products and the potential for mass production, our one-step a new toolbox for generating (multi-)functional nanoemulsions and nanoparticles.

References

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