Toward longer-lasting fragrances

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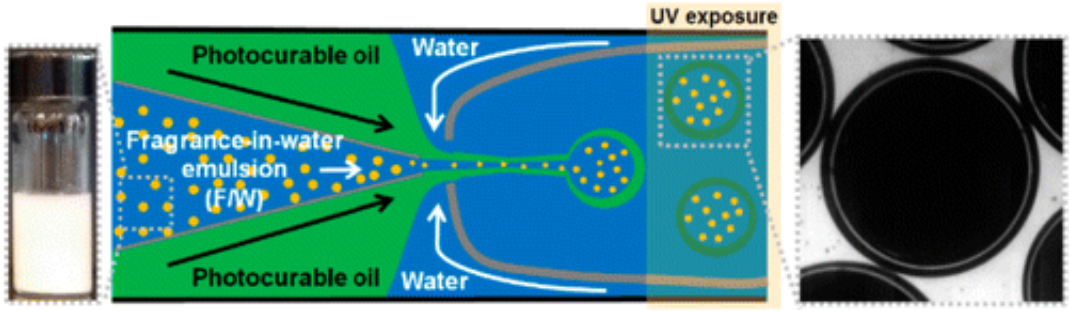

Fragrances can be powerful. They can sooth or revitalize, evoke the forest or sea, and remind us of the past. To capture them, manufacturers infuse scents into products from toilet bowl cleaners to luxury perfumes. But once released from a bottle, fragrances evaporate quickly. Now researchers report in the journal *ACS Applied Materials & Interfaces* a new way to encapsulate fragrance molecules to make a product's scent last.

The challenge with creating long-lasting fragrances is that aroma molecules tend to be small and volatile. That means they can sneak through barriers easily and disperse quickly. Some methods have been developed to prevent fragrance molecules from hastily escaping from a spritz of perfume or a dollop of lotion. For example, one process slows down the molecules by packaging them in microcapsules. But the technique is inefficient and doesn't control for shell size, thickness or

structure, which makes it harder to work with. David A. Weitz and colleagues wanted to figure out a new strategy using microfluidic and bulk emulsification to encapsulate fragrances.

First, to get a homogeneous mixture of water and α-pinene molecules—found in oils from pine trees and rosemary—the researchers emulsified them (think blending together two ingredients like oil and vinegar that normally separate). Pumping the emulsion into tiny glass microfluidic tubes created uniform microcapsules. Testing showed that the capsules successfully slowed the release of α-pinene. In addition to its use in the fragrance industry, the researchers say the technique could have applications in drug delivery or other areas.

More information: Hyomin Lee et al. Encapsulation and Enhanced Retention of Fragrance in Polymer Microcapsules, *ACS Applied Materials & Interfaces* (2016). DOI: 10.1021/acsami.5b11351

Abstract
Fragrances are amphiphilic and highly volatile, all of which makes them a challenging cargo to efficiently encapsulate and retain in microcapsules using traditional approaches. We address these limitations by introducing a new strategy that combines bulk and microfluidic emulsification: a stable fragrance-in-water (F/W) emulsion that is primarily prepared from bulk emulsification is incorporated within a polymer microcapsule via microfluidic emulsification. On the basis of the in-depth study of physicochemical properties of the microcapsules on fragrance leakage, we demonstrate that enhanced retention of fragrance can be achieved by using a polar polymeric shell and forming a hydrogel network within the microcapsule. We further extend the utility of these microcapsules by demonstrating the enhanced retention of encapsulated fragrance in powder state.

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