ENGINEERING SENSORIAL EXPERIENCES BY MODULATING FRAGRANCE MICROCAPSULE MECHANICS AND MORPHOLOGY

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Fragrance delivery systems and technologies are incorporated into many consumer products in order to enhance the sensorial experience and provide performance cues. To engineer substantive, controlled-release fragrance microcapsules which selectively adhere to targeted substrates, we program large physical deformations into the capsule geometry of stable, oil-loaded microcapsules during the interfacial polymerization process. Shape anisotropy is introduced by exploiting the buckling phenomenon which is related to the interfacial viscoelasticity of the burgeoning membrane, and this shape anisotropy results in the formation of novel 'suction caps' with favorable microcapsule-substrate interactions. The deformations are tuned by modulating the mechanical properties of the microcapsule membranes in 3D and 2D, and these mechanical differences are successfully probed by imaging studies and interfacial rheology. The capsule interaction area is enhanced to promote adhesion onto targeted substrates such as glass, hair, skin and fabric in model systems and consumer formulations. Quantitative deposition tests and sensory trials substantiate the benefits of modulating and measuring microcapsule membrane properties and morphology in a scalable, industrially-relevant process while systematically optimizing the consumer product formulation-independent physical parameters of our system.