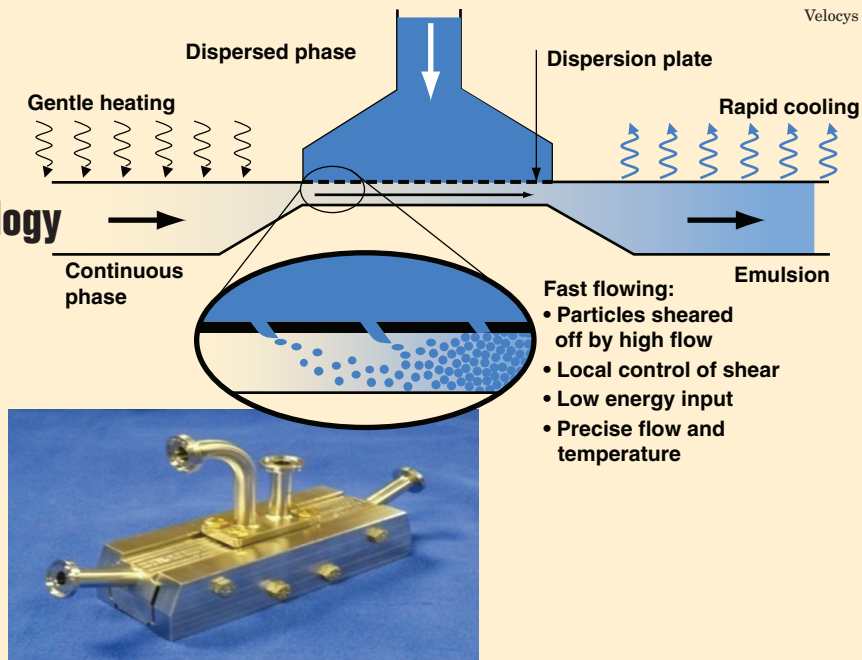


Commercial testing set for 'smooth' emulsification technology

A new emulsification process, known as ASmooth, has been developed by Velocys, Inc. (Columbus, Ohio; www.velocys.com) — a member of the Oxford Catalyst Group Plc. (Abingdon, U.K.) — and is now ready for testing at the commercial scale. Smooth technology is based on microchannel devices, and has undergone successful pilot trials by a number of major companies in the cosmetic and personal care industries using a pilot device, which can produce up to 5 L/min of an emulsion. For commercial-scale production, the process can be scaled up readily by adding (numbering up) modules that retain the same process parameters proven in the small scale, says product manager Mark Grace.

In microchannel emulsification (diagram), droplets are formed one at a time by pumping the discontinuous phase through a porous dispersion plate into a crossflow of the continuous phase. This allows for high shear at the wall but low bulk shear to avoid damaging fragile emulsion components, explains Grace. The plates are stacked together to form a module, which can also incorporate microchannel plates for heating or cooling. Five modules can be combined inside a cradle for production capacities of up to 25 L/min.



The microchannel emulsifier can produce very small droplets (down to 1 μm and below) with a narrow droplet-size distribution, which leads to stable emulsions that reduce or eliminate the need for surfactants. Smooth technology has the advantage of precise mixing and control of mixing energy, which can “greatly” reduce the energy required to form emulsions, especially compared to rotor mixers, says Grace. The precise process control and very-low liquid inventories required by Smooth minimizes the amount of off-specification product and materials discarded during cleaning, he says.