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Formation of Surface Protic Ionic Liquid Nanodroplets for Nanofabrication

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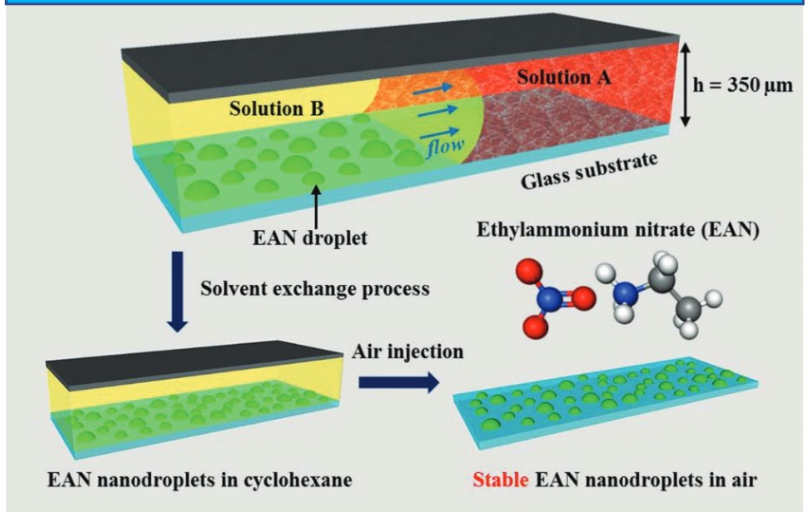
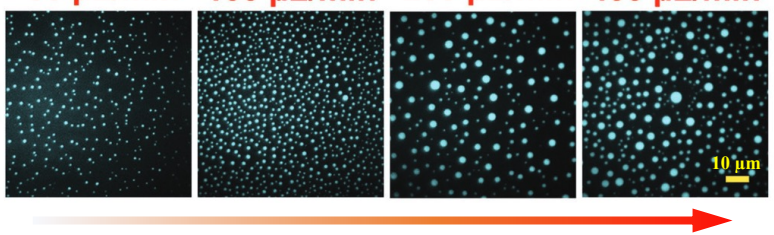
Scheme



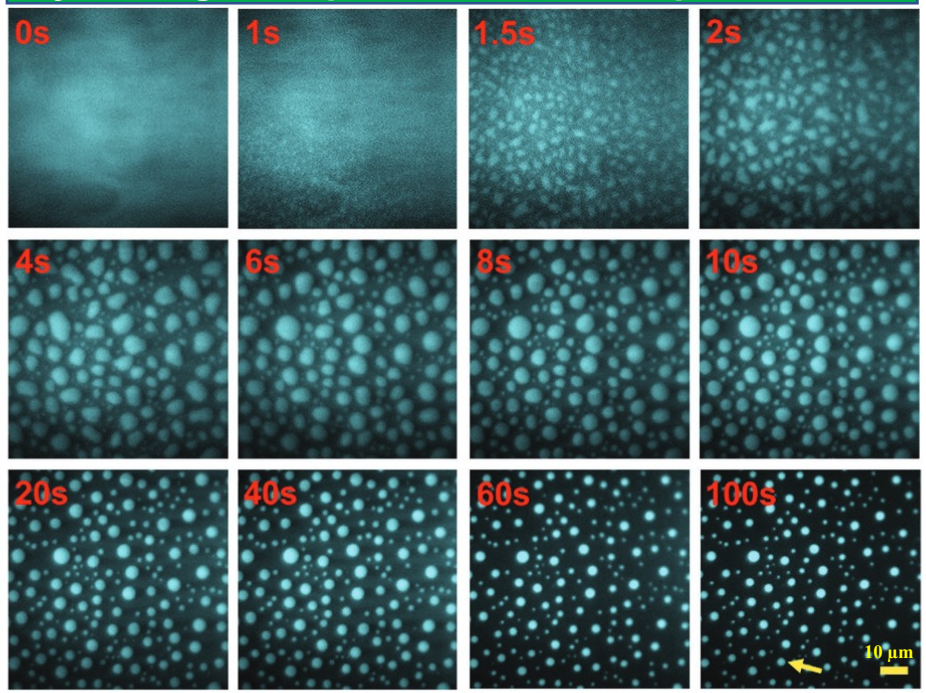
EAN nanodroplets formation on the glass substrate in cyclohexane phase and air phase.
The microfluidic channel is first filled with **solution A** (EAN-rich aqueous solution) and then exchanged by **solution B** (cyclohexane with low EAN solubility).

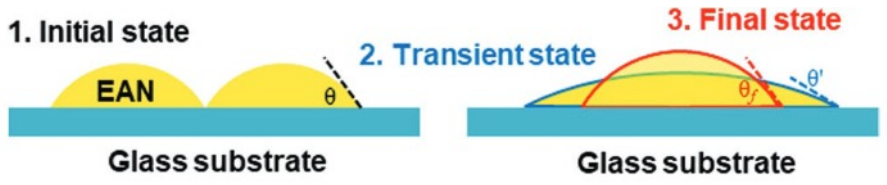
Size vs. different flow rates



Faster flow rate, larger EAN size, $V_{area} \sim Q$.

Dynamic growth process of EAN droplets

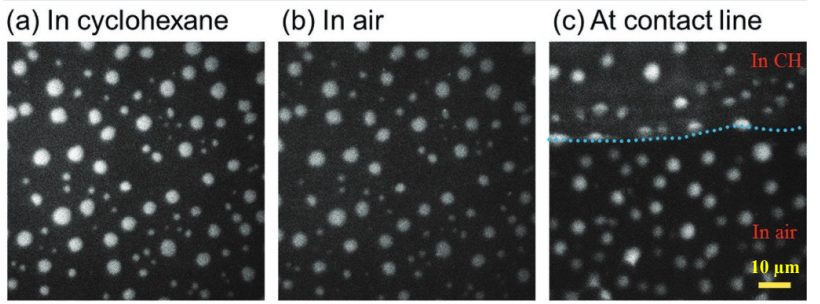




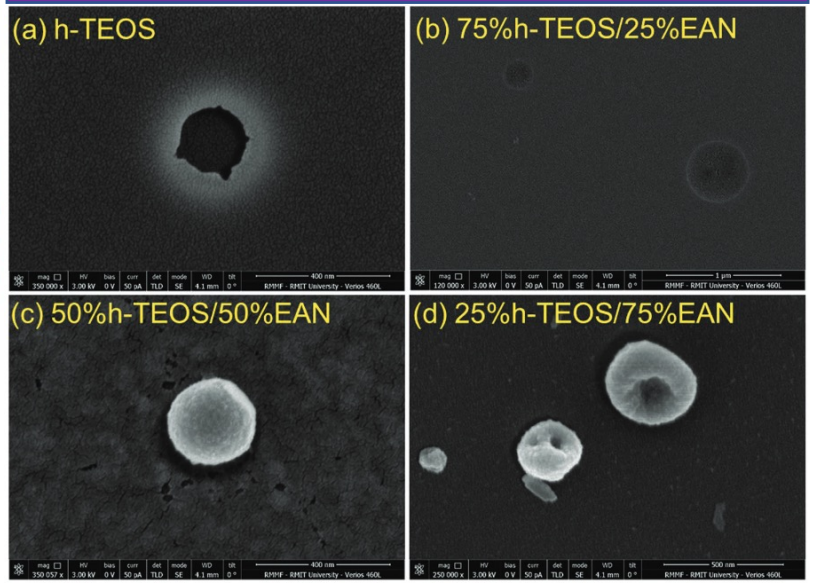
$$\mathrm{Oh} = \mu/\sqrt{\rho\gamma L} = 4.7 > 1$$

Dynamic growth process of EAN surface nanodroplets could be dominated by more viscous dissipation effects than surface tension.

Stability during phase transition



Application: Femtoliter Nanoreactors in air



$$Si(OH)_4 \xrightarrow{\Delta} SiO_2 + 2H_2O$$

In-situ synthesis of SiO_2 surface nanostructures in h-TEOS /EAN nanodroplets in air phase.