Supplementary Information

Size Reduction of Cosolvent-Infused Microbubbles to Form Acoustically Responsive Monodisperse Perfluorocarbon Nanodroplets

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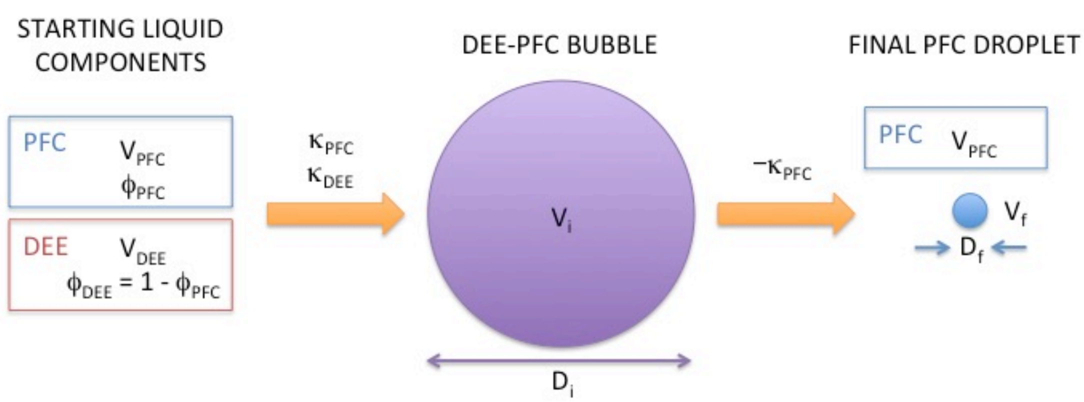
Determination of DEE volume expansion coefficient from liquid to gas phase:



Where:

V_{PFC} = volume of PFC (liquid)
V_{DEE} = volume of DEE (liquid)
ϕ_{PFC} = starting volume fraction of PFC
κ_{PFC} = volume expansion coefficient of PFC
κ_{DEE} = volume expansion coefficient of DEE
V_i = volume of initial DEE-PFC bubble
V_f = volume of final PFC droplet
D_i = diameter of initial DEE-PFC bubble
D_f = diameter of final PFC droplet

$$V_i = \frac{\pi}{6}{D_i}^3 = V_{PFC}\kappa_{PFC} + V_{DEE}\kappa_{DEE} + V_{mixture}$$

$$V_f = \frac{\pi}{6}{D_f}^3 = V_{PFC}$$

$$\frac{V_i}{V_f} = \kappa_{PFC} + \frac{V_{DEE}}{V_{PFC}}\kappa_{DEE} + \frac{V_{mixture}}{V_{PFC}}$$

Assuming that the volume of mixed PFC and DEE gas ($V_{mixture}$) is small:

$$\frac{V_i}{V_f} = \kappa_{PFC} + \frac{1-\phi_{PFC}}{\phi_{PFC}}\kappa_{DEE}$$

$$\frac{V_i}{V_f} = \kappa_{PFC} - \kappa_{DEE} + \kappa_{DEE}\frac{1}{\phi_{PFC}}$$

Thus, the volume expansion coefficient of DEE (κ_{DEE}) can be extracted by plotting the experimental values of V_i/V_f versus the inverse of the volume fraction of PFC in the starting liquid, with the slope giving κ_{DEE} (Figure S1).

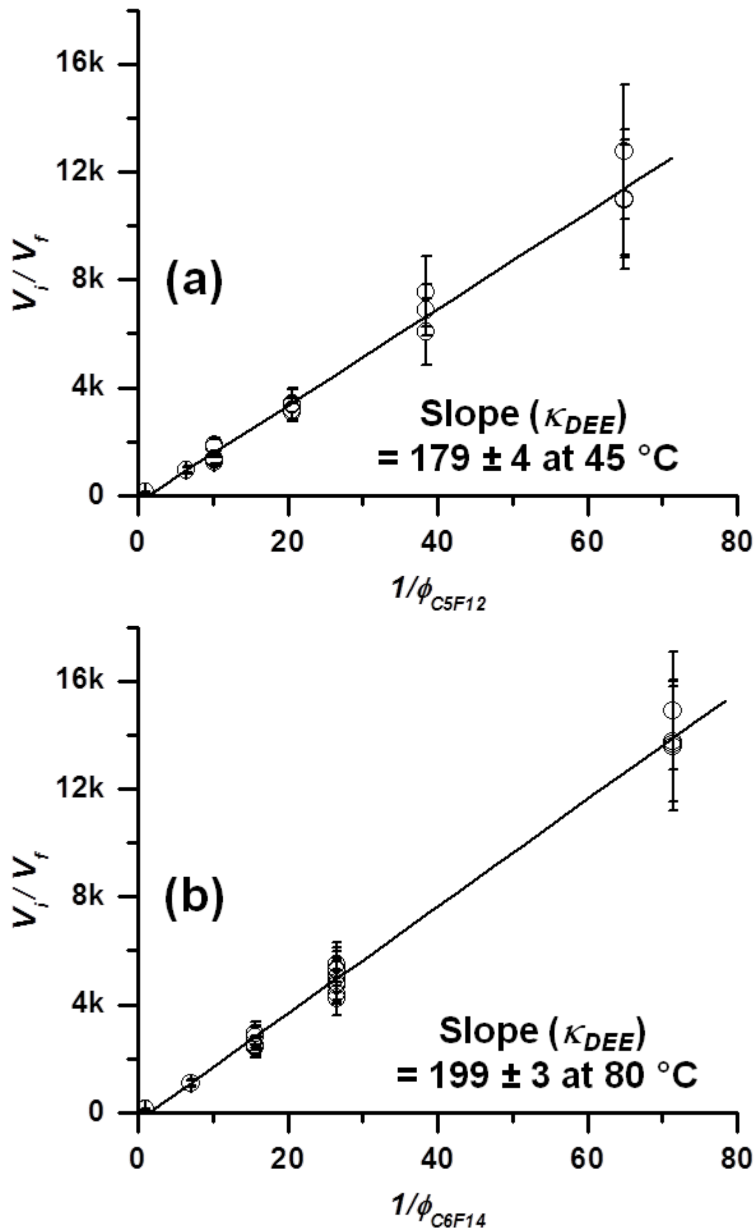


Figure S1. V_i/V_f of PFC droplets versus the inverse of the starting volume fraction of PFC (ϕ_{PFC}). DEE volume expansion coefficient (κ_{DEE}) (a) at 45 °C (from C_5F_{12} data) and (b) at 80 °C (from C_6F_{14} data) were found from the slope of each plot.