

Supplementary Information for

**Viscoelasticity enhances nanometer-scale slip in gigahertz-frequency liquid flows**

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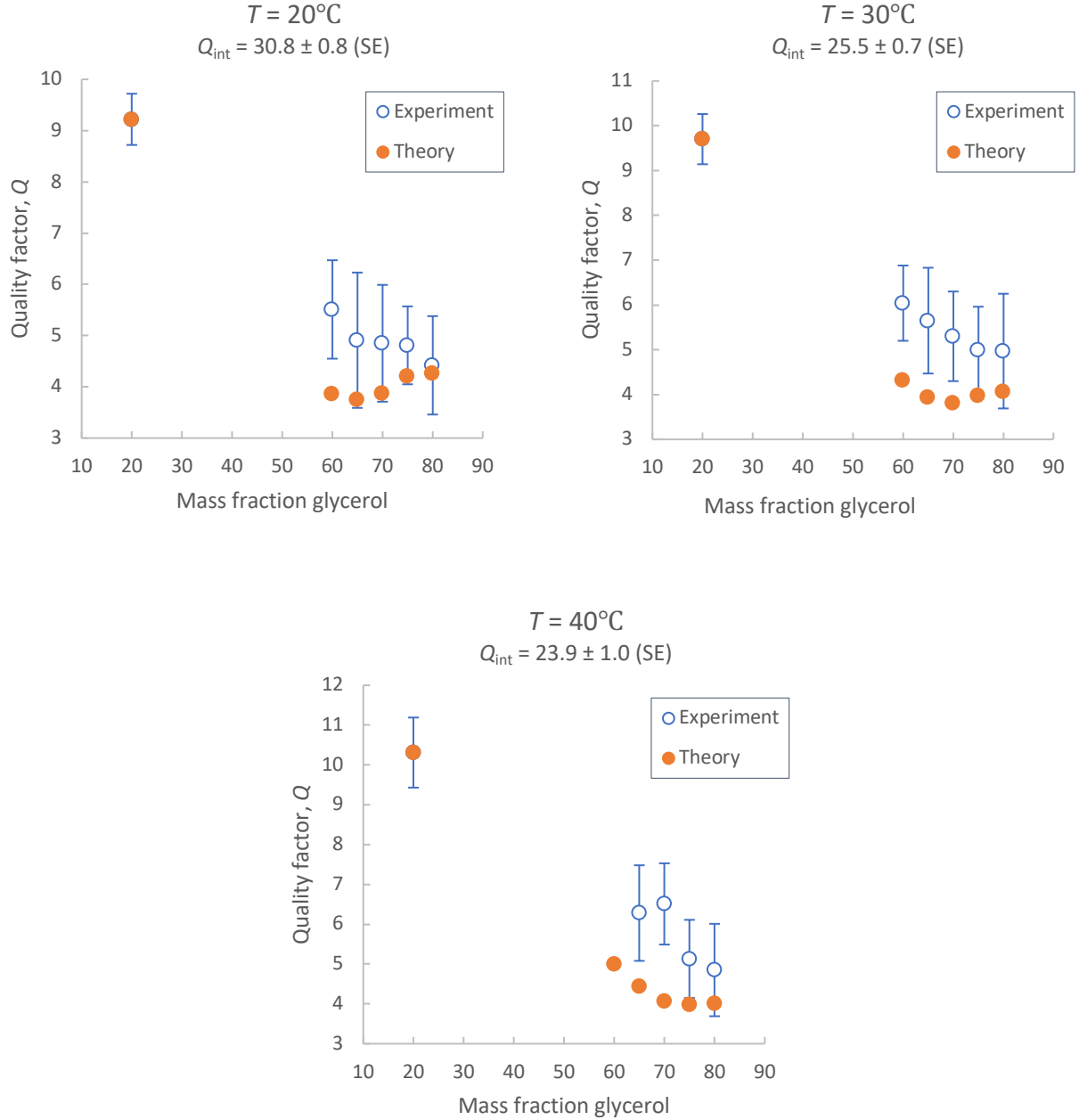
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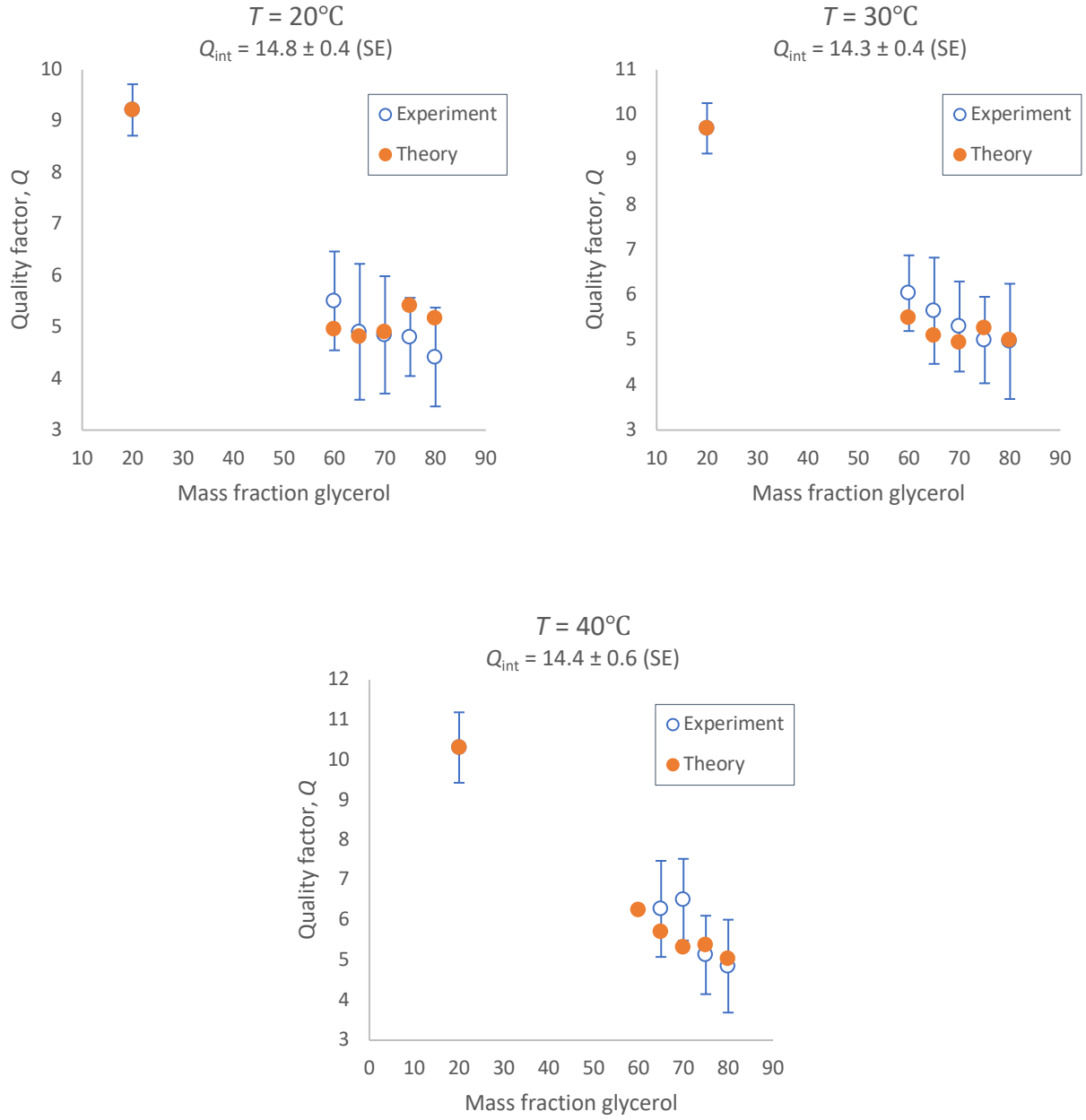
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## I. Complementary analysis of quality factor at fixed temperature



**Figure 1** Comparison of *no-slip* viscoelastic model and measurement. The *no-slip* viscoelastic model together with an (unknown) intrinsic quality factor is compared to measurements at *fixed temperature*. The intrinsic quality factor,  $Q_{\text{int}}$ , is determined by matching the theoretical model to measurement at 20% glycerol (as indicated in each subfigure). Because the temperature is constant for each set of measurements,  $Q_{\text{int}}$  is also strictly constant. This matched value of  $Q_{\text{int}}$  is then used with the *no-slip* viscoelastic model at higher glycerol concentrations, with the result that theoretical predictions consistently underestimate measured quality factors.



**Figure 2** Comparison of *slip* viscoelastic model and measurement. As for Supplementary Information Figure 1, while using the viscoelastic theoretical model with a slip length of 3.7 nm. The determined intrinsic quality factor,  $Q_{\text{int}}$ , is now found to be independent of temperature, and theoretical predictions agree with measurements.