

Electronic Supplementary Information

Nanofluid acrylate composite resins – Initial preparation and characterization

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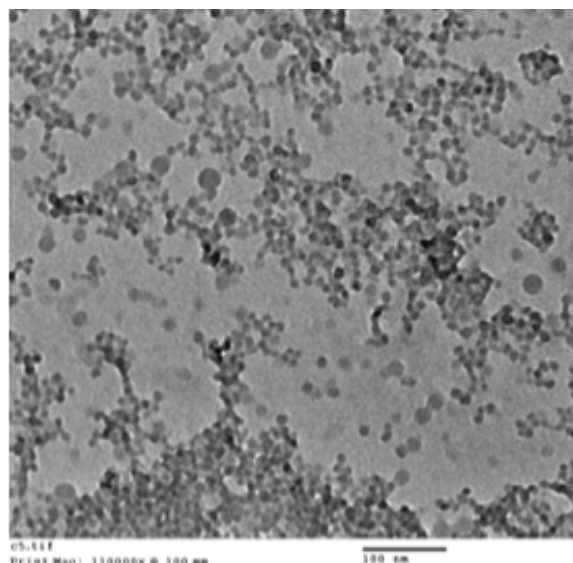


Fig. S1. TEM of nanosilica used as cores for the surface modified nanofluid nanoparticles. The scale bar represents a length of 100 nm.

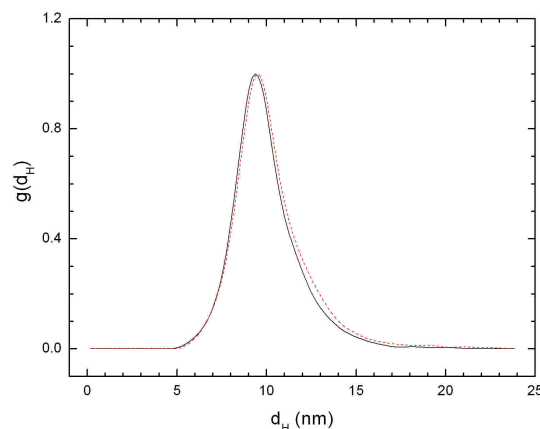


Fig. S2. Analytical ultracentrifugation of nanosilica showing the nominal distribution as a function of hydrodynamic diameter (d_H). Samples were run at dilutions of 1:100 (—) and 1:200 (.....) (v/v). Data kindly provided by Ms. Antje Volker and Prof. Helmut Cölfen of the Max Planck Institute for Colloids and Interfaces, Potsdam (Golm), Germany.

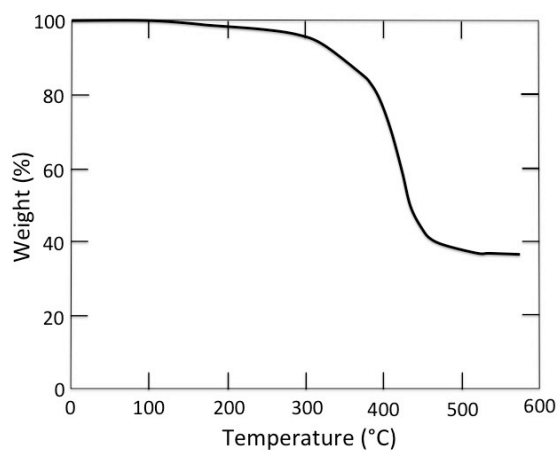


Fig. S3. TGA of acrylate nanofluid in a nitrogen stream. The net decomposition at 580°C is 63.1%.

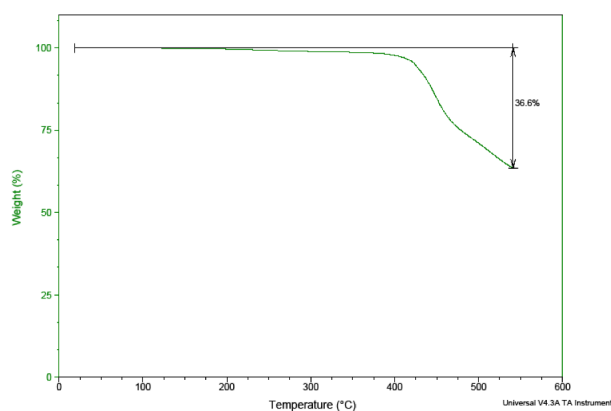


Fig. S4. Thermogravimetric analysis of acrylate modified nanosilica.

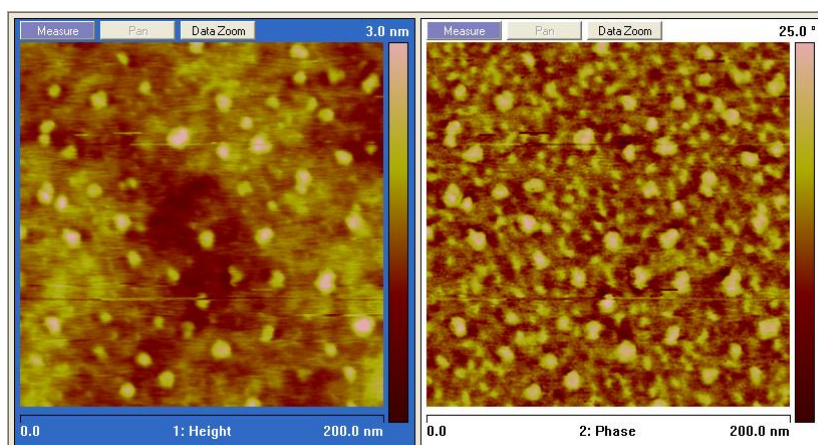


Fig. S5. AFM tapping mode images (left, elevation; right, phase) of 0.5% (w/w) acrylate nanofluid in THPETA after UV curing.

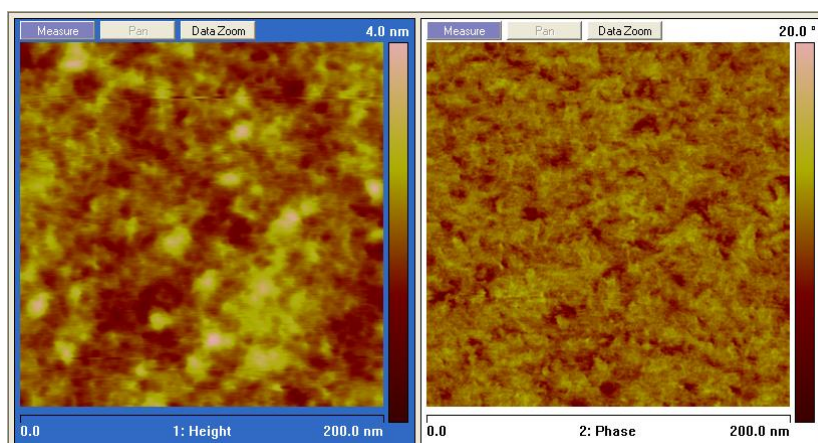


Fig. S6. AFM tapping mode images (left, elevation; right, phase) of 1% (w/w) acrylate nanofluid in THPETA after UV curing.

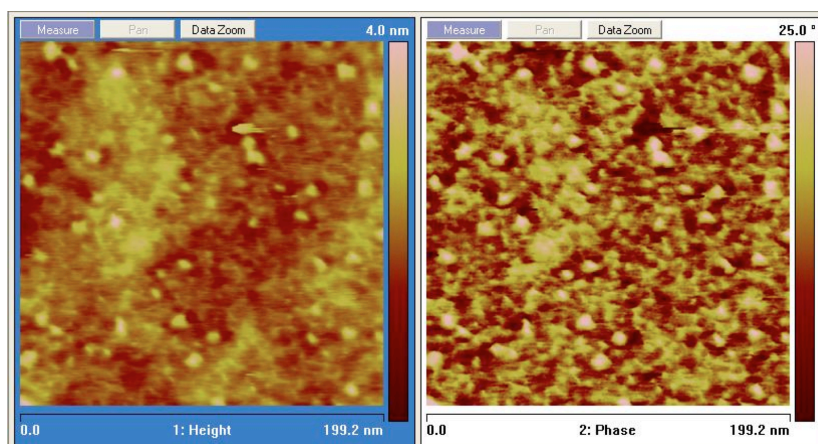


Fig. S7. AFM tapping mode images (left, elevation; right, phase) of 3% (w/w) acrylate nanofluid in THPETA after UV curing.

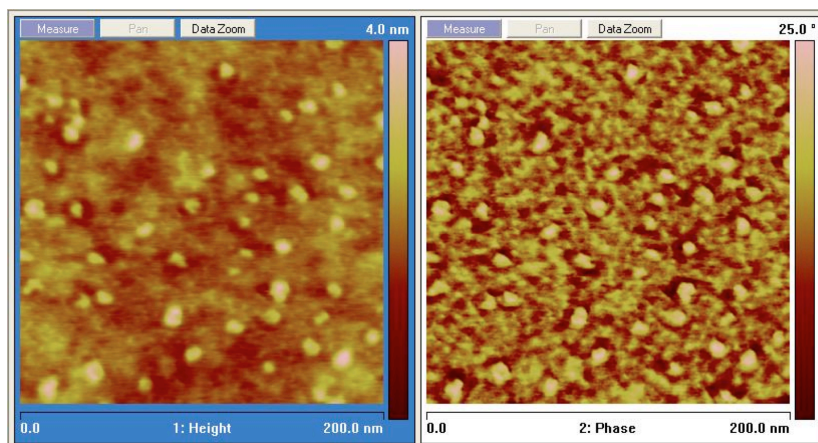


Fig. S8. AFM tapping mode images (left, elevation; right, phase) of 5% (w/w) acrylate nanofluid in THPETA after UV curing.

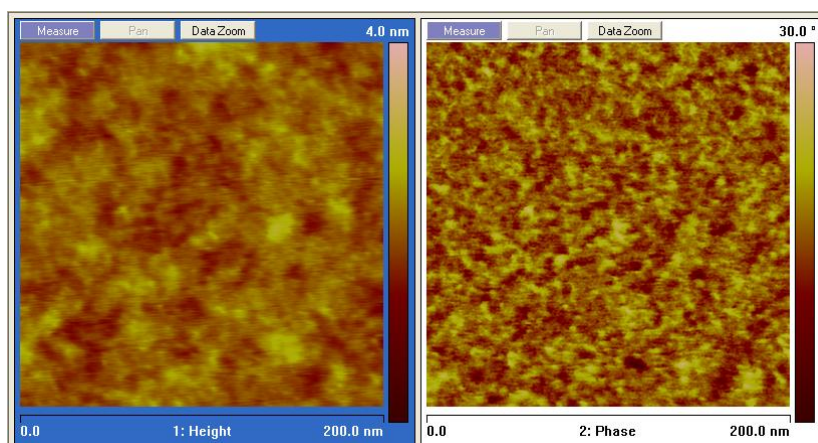


Fig. S9. AFM tapping mode images (left, elevation; right, phase) of 1% (w/w) acrylate modified nanosilica in THPETA after UV curing.

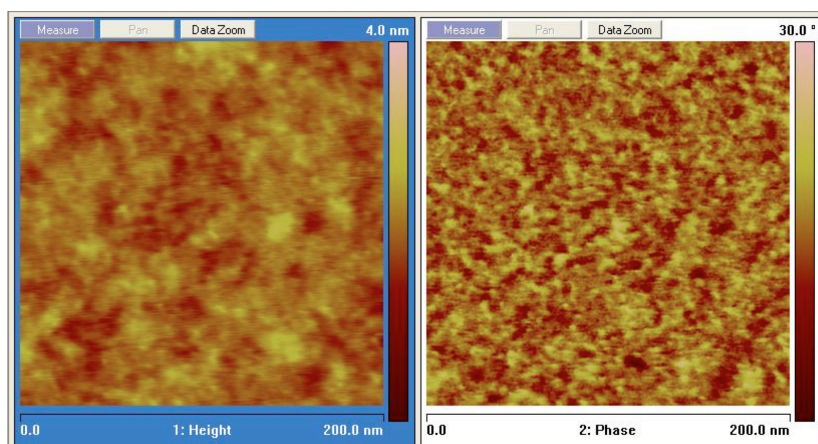


Fig. S10. AFM tapping mode images (left, elevation; right, phase) of 2% (w/w) acrylate surface modified nanosilica in THPETA after UV curing.

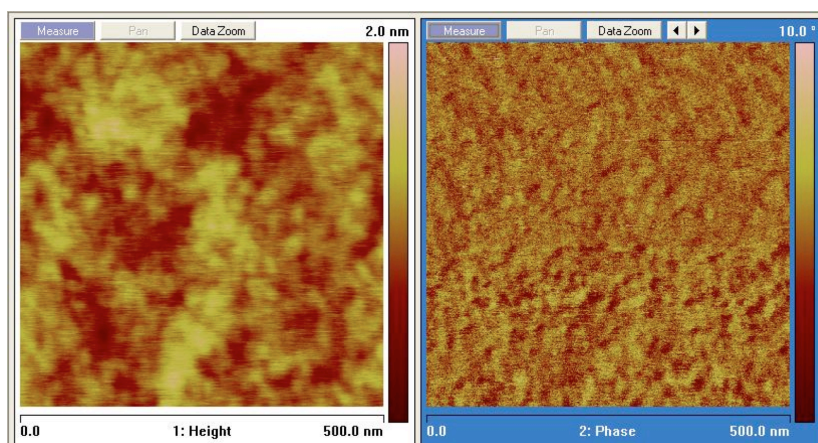


Fig. S11. AFM tapping mode images (left, elevation; right, phase) of THPETA control resin without any incorporated nanofluid or nanosilica.

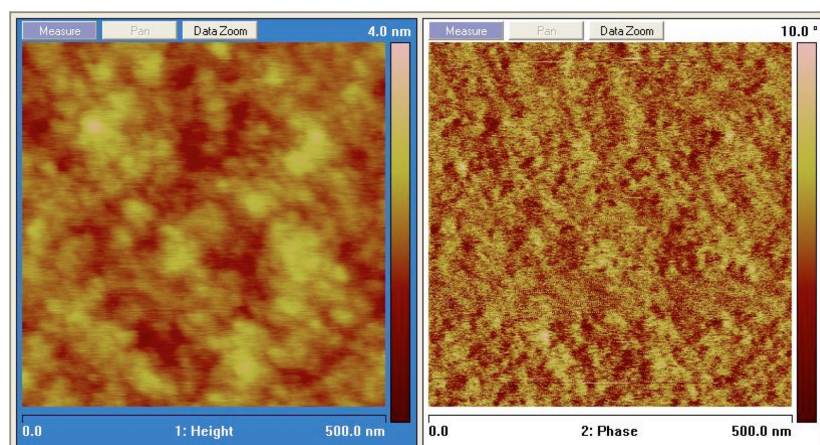


Fig. S12. AFM tapping mode images (left, elevation; right, phase) of 50% (w/w) acrylate nanofluid in THPETA after UV curing.

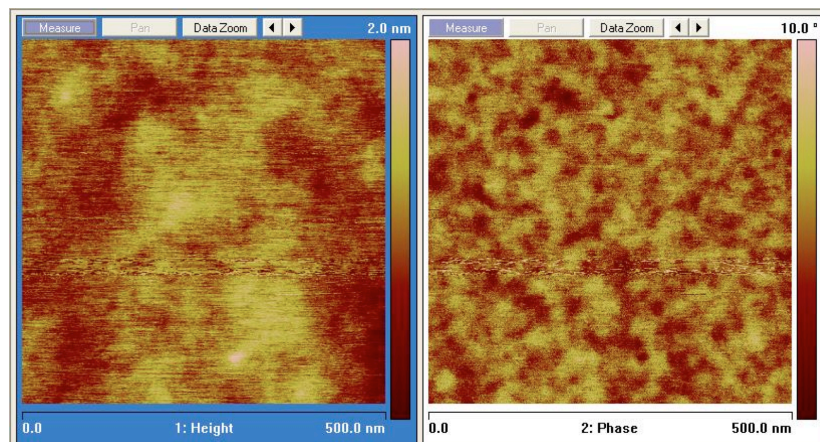


Fig. S13. AFM tapping mode images (left, elevation; right, phase) of 80% (w/w) acrylate nanofluid in THPETA after UV curing.

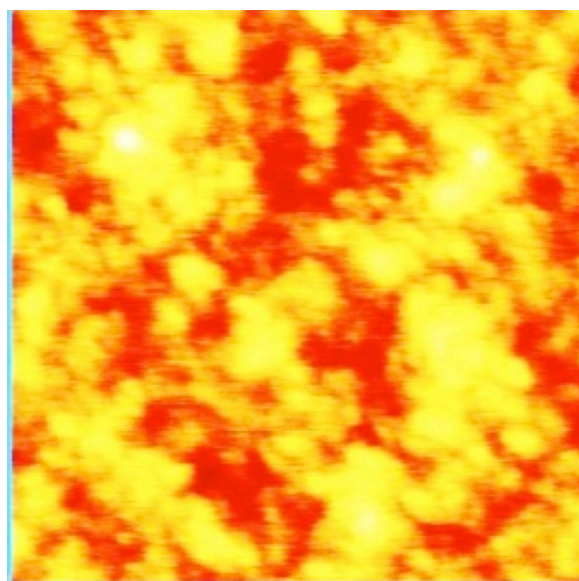


Fig. S14. High contrast false coloration of AFM image of Fig. S12.

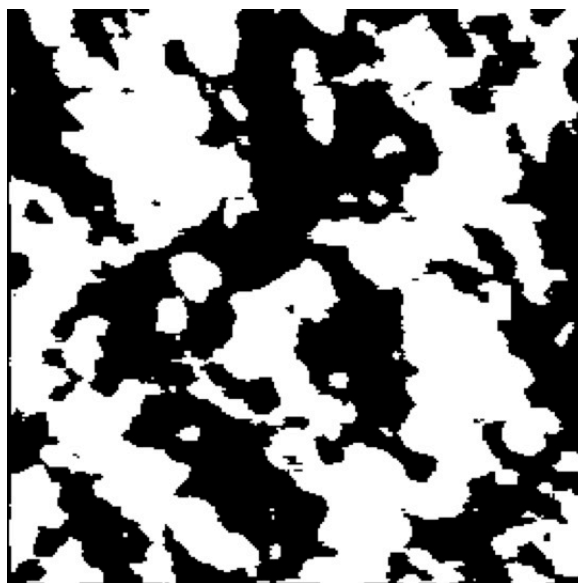


Fig. S15. Conversion of image of Fig. S14 to a black and white image suitable for image analysis.

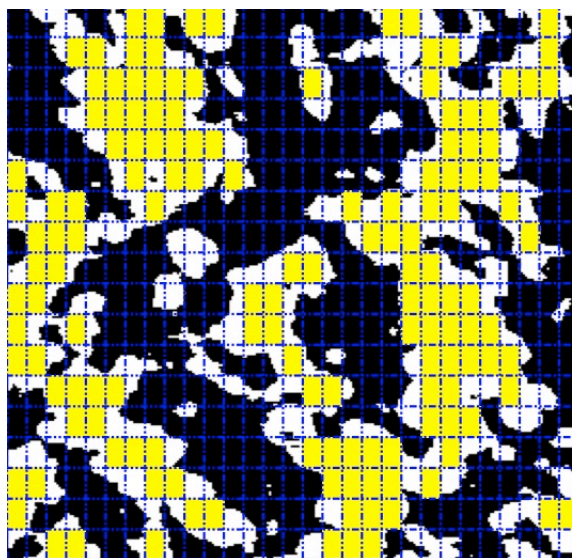


Fig. S16. Superposition of grid upon image of Fig. S15, and initial coloration of all completely white cells with yellow.

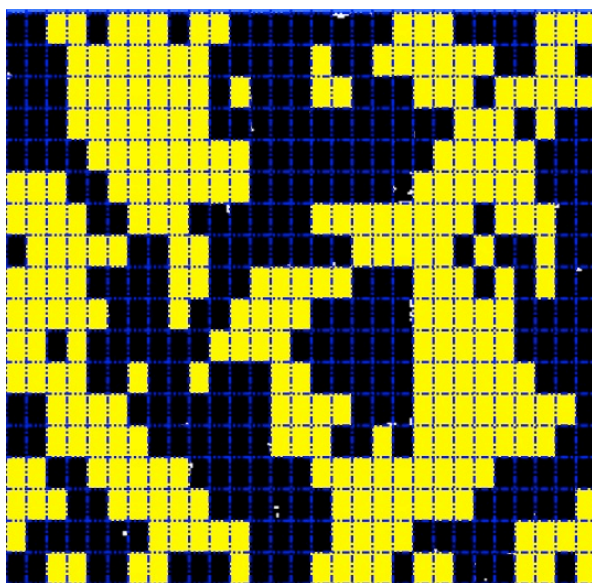


Fig. S17. Final pixilation wherein cells of approximately equal white and black portions have been converted to fully yellow and black respectively. The yellow cells represent the equivalent area surface projection of nanofluid clusters at the interface, and number 268 out of a total of 462 cells.