

Effective Thermal Conductivity of Cyclohexane-Based Nanofluids Containing Cerium Dioxide Nanoparticles with Chemisorbed Organic Shell

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S1. Measurement results for the translational particle diffusion coefficients and hydrodynamic diameters obtained by DLS

Table S1. Measurement results for the translational particle diffusion coefficient D_p and the hydrodynamic diameters $d_{H,DLS}$ for the two types of C_{10} -CeO₂ particles dispersed in cyclohexane at a core particle volume fraction of $\phi_p = 10^{-4}$ or 10^{-3} at ambient pressure for different temperatures T . The corresponding expanded ($k = 2$) uncertainties $U_r(D_p)$ and $U(d_{H,DLS})$ are also provided.^a

System	ϕ_p	T / K	$10^{11} D_p / (m^2 \cdot s^{-1})$	$U_r(D_p)$	$d_{H,DLS} / nm$	$U(d_{H,DLS}) / nm$
C ₁₀ -CeO ₂ 4.6 nm core (TEM)	10 ⁻⁴	293.12	5.33	0.027	8.2	0.3
		283.26	4.29	0.060	8.4	0.7
	10 ⁻³	293.14	5.12	0.025	8.6	0.4
		293.16 ^b	5.34	0.035	8.2	0.3
		303.07	6.56	0.043	8.2	0.6
		313.12	8.05	0.029	8.1	0.4
		347.95	14.6	0.013	7.9	0.2
C ₁₀ -CeO ₂ 6.0 nm core (TEM)	10 ⁻⁴	293.14	4.90	0.034	8.9	0.5
		283.15	3.95	0.042	9.2	0.5
	10 ⁻³	293.16	4.83	0.031	9.1	0.5
		293.15 ^b	4.89	0.018	9.0	0.2
		303.21	6.15	0.033	8.7	0.5
		313.08	7.47	0.037	8.7	0.6
		348.06	13.46	0.038	8.5	0.5

^a Expanded ($k = 2$) uncertainties in ϕ_p and T are $U_r(\phi_p) = 0.03$ and $U(T) = 0.02$ K

^b Repetition measurement on the same sample after measurements at $T = 313$ K

S2. Particle size distributions for $q_6(d_{C,AUC})$ derived from AUC measurements

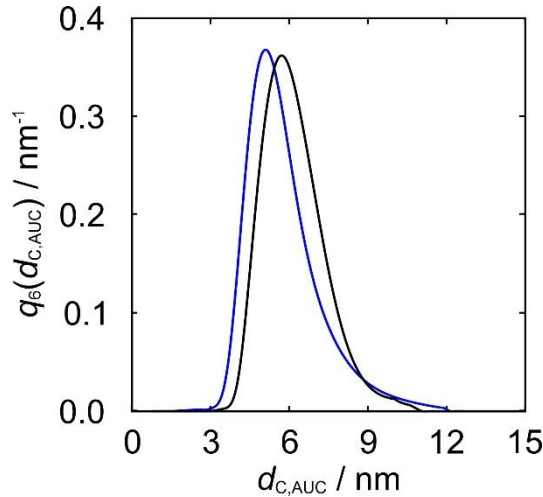


Fig. S1: Size distributions $q_6(d_{C,AUC})$ as a function of the core diameter $d_{C,AUC}$ based on the AUC measurements at 293.15 K: —, C₁₀-CeO₂-4.6 nm core (TEM); —, C₁₀-CeO₂-6.0 nm core (TEM).

S3. Measurement results for the thermal conductivity of pure cyclohexane using GPPI

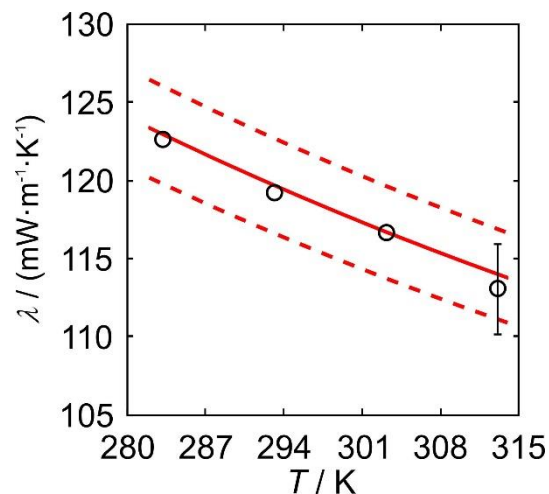


Fig. S2: Thermal conductivity λ of cyclohexane at atmospheric pressure as a function of T obtained with GPPI for $s = 1.59$ mm and $\Delta T = 2.5$ K: $\bigcirc$, this work based on average from four individual measurements; —, reference correlation [1]. The exemplary error bar and the dashed lines represent the expanded ($k = 2$) uncertainties in the measured values and the reference correlation for the thermal conductivity.

References

1. A. Koutian, M. J. Assael, M. L. Huber, and R. A. Perkins, J Phys Chem Ref Data **46**, 013102 (2017), <https://doi.org/10.1063/1.4974325>.