

Tribological Behavior of Nanolubricants Based on Coated Magnetic Nanoparticles and Trimethylolpropane Trioleate Base Oil

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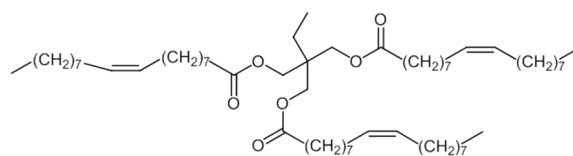


Figure S1. Chemical structure of trimethylolpropane trioleate.

Table S1. Experimental density, ρ / g·cm⁻³ of the nanodispersions and base oil as a function of temperature.

<i>T/K</i>	ρ / g cm ⁻³			
	<i>TMPTO</i>	<i>0.015 wt%</i> <i>(Fe₃O₄-6.3nm)</i>	<i>0.015 wt%</i> <i>(Fe₃O₄-10 nm)</i>	<i>0.015 wt%</i> <i>(Nd alloy -19 nm)</i>
278.15	0.9258	0.9270	0.9264	0.9274
283.15	0.9226	0.9238	0.9234	0.9242
288.15	0.9193	0.9204	0.9197	0.9209
293.15	0.9161	0.9172	0.9167	0.9177
298.15	0.9129	0.9137	0.9132	0.9144
303.15	0.9096	0.9106	0.9101	0.9112
308.15	0.9064	0.9071	0.9068	0.9079
313.15	0.9031	0.9037	0.9034	0.9047
318.15	0.8998	0.9007	0.9001	0.9014
323.15	0.8966	0.8974	0.8970	0.8981
328.15	0.8933	0.8940	0.8937	0.8949
333.15	0.8900	0.8907	0.8903	0.8915
338.15	0.8867	0.8875	0.8871	0.8883
343.15	0.8835	0.8842	0.8840	0.885
348.15	0.8802	0.8810	0.8807	0.8817
353.15	0.8769	0.8775	0.8772	0.8784
358.15	0.8736	0.8743	0.8740	0.8751
363.15	0.8704	0.8712	0.8707	0.8719
368.15	0.8671	0.8678	0.8674	0.8686
373.15	0.8639	0.8644	0.8642	0.8653

Table S2. Experimental dynamic viscosity, η / mPa·s, of the nanodispersions and base oil as a function of temperature.

T/K	η / mPa·s			
	TMPTO	0.015 wt% (Fe ₃ O ₄ -6.3nm)	0.015 wt% (Fe ₃ O ₄ -10 nm)	0.015 wt% (Nd alloy -19 nm)
278.15	247.3	252.4	251.0	254.3
283.15	184.2	187.9	186.7	189.1
288.15	140.1	142.8	141.9	143.6
293.15	108.4	110.4	109.8	111.1
298.15	85.29	86.83	86.34	87.25
303.15	68.14	69.32	68.95	69.63
308.15	55.21	56.14	55.84	56.36
313.15	45.32	46.04	45.81	46.22
318.15	37.64	38.23	38.05	38.36
323.15	31.61	32.11	31.96	32.21
328.15	26.82	27.15	27.02	27.30
333.15	22.98	23.24	23.14	23.27
338.15	19.84	20.10	20.02	20.13
343.15	17.28	17.53	17.44	17.54
348.15	15.15	15.36	15.29	15.37
353.15	13.38	13.55	13.49	13.56
358.15	11.88	12.04	11.98	12.04
363.15	10.62	10.75	10.70	10.75
368.15	9.536	9.646	9.607	9.650
373.15	8.611	8.714	8.675	8.714

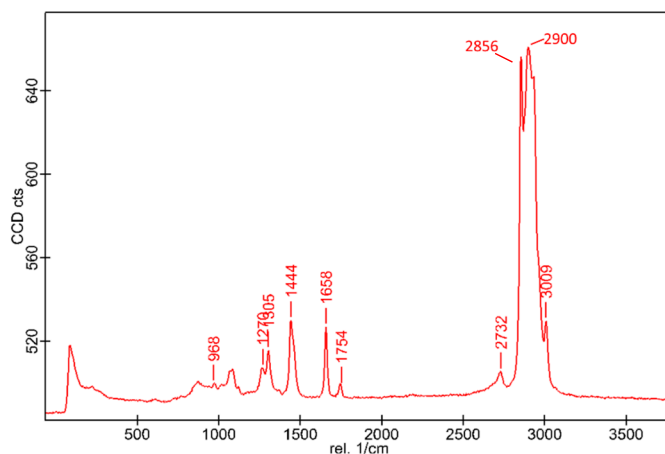


Figure S2. Raman spectrum of trimethylolpropane trioleate (TMPTO).

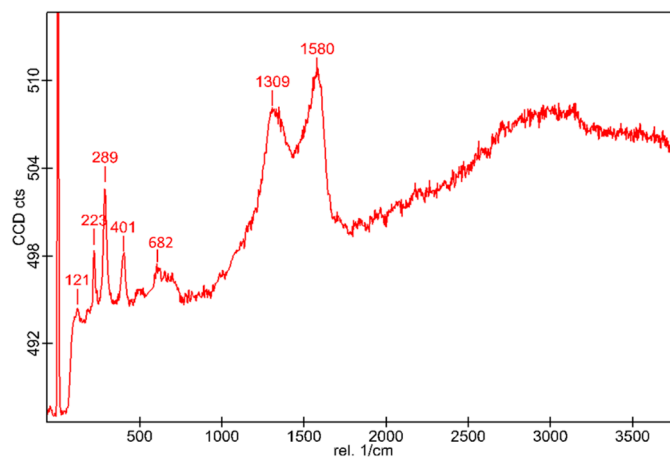


Figure S3. Raman spectrum of both Fe_3O_4 (6.3nm) and Fe_3O_4 (10 nm) nanoparticles coated with oleic acid.

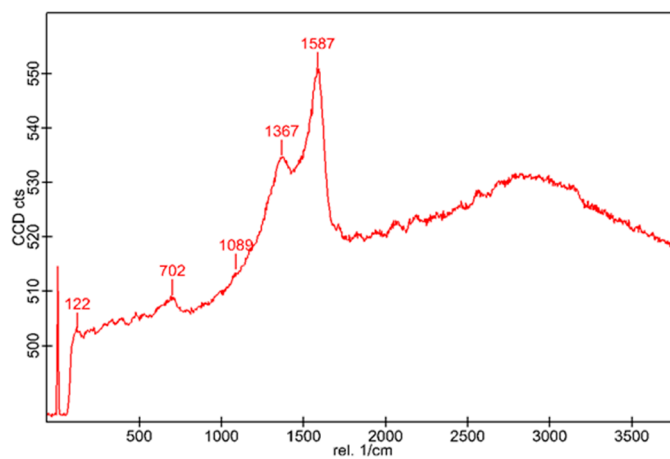


Figure S4. Raman spectrum of Nd alloy (19 nm) nanoparticles coated with oleic acid.