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Experimental rheometry of melts and supercooled liquids in the system $NaAlSiO_4$-SiO_2: Implications for structure and dynamics

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For deposit: Table 3

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Table 3. Rheometric measurements

Sample *	T (° C) **	N †	r ††	Shear Rate Range (s^{-1}) ‡	Shear Stress Range (Pa /10^5) ‡‡	m /10^5 (Pa s^n) §	σ_m	n	σ_n
N20	1300	40	0.994	0.116 - 1.822	0.422 - 6.064	3.341	0.107	0.974	0.018
	1275	35	0.998	0.166 - 1.779	1.022 - 11.515	6.370	0.110	0.999	0.011
	1250	35	0.995	0.059 - 0.838	0.906 - 9.743	10.572	0.352	0.877	0.015
	1225	55	0.998	0.023 - 0.401	0.668 - 8.449	18.373	0.402	0.887	0.008
	1200	30	0.995	0.008 - 0.256	0.334 - 10.220	39.808	2.493	0.974	0.018
	1175	25	0.997	0.011 - 0.179	0.736 - 14.581	93.933	6.478	1.072	0.018
	1150	20	0.997	0.008 - 0.132	1.076 - 16.693	137.940	9.718	1.000	0.017
	1125	15	0.996	0.011 - 0.056	3.147 - 15.876	302.290	34.288	1.018	0.026
	1100	10	0.995	0.012 - 0.025	6.623 - 13.518	505.720	86.345	0.980	0.036
N24	1300	44	0.987	0.182 - 3.732	0.238 - 5.014	1.243	0.041	0.925	0.023
	1275	50	0.996	0.126 - 3.840	0.293 - 6.225	1.726	0.031	0.891	0.011
	1250	40	0.998	0.101 - 2.458	0.422 - 7.781	3.254	0.052	0.948	0.009
	1225	41	0.999	0.054 - 1.715	0.331 - 9.774	5.697	0.103	0.992	0.008
	1200	45	0.999	0.012 - 0.771	0.180 - 8.241	10.574	0.229	0.909	0.007
	1175	35	0.997	0.014 - 0.364	0.253 - 7.850	21.426	0.884	0.964	0.012
	1150	27	0.996	0.013 - 0.237	0.543 - 8.892	39.411	2.374	0.963	0.016
	1125	20	0.997	0.011 - 0.126	0.736 - 8.854	69.769	4.866	0.974	0.017
	1100	12	0.996	0.012 - 0.055	2.070 - 9.084	165.300	21.588	0.979	0.028
	1075	10	0.997	0.011 - 0.026	3.496 - 8.087	297.250	35.677	0.985	0.025

Table 3.(cont) Rheometric measurements

Sample *	T (° C) **	N †	r ††	Shear Rate Range (s^{-1}) ‡	Shear Stress Range (Pa /10^5) ‡‡	m /10^5 (Pa s^n) §	σ_m	n	σ_n
N33A	1350	4	0.997	2.889 - 8.650	0.687 - 1.850	0.269	0.013	0.907	0.049
	1300	7	0.997	0.498 - 8.462	0.328 - 4.930	0.698	0.021	0.922	0.030
	1275	7	0.999	0.476 - 8.177	0.465 - 7.311	1.019	0.020	0.969	0.020
	1250	7	0.998	0.255 - 5.820	0.530 - 8.308	1.767	0.044	0.873	0.022
	1225	6	0.997	0.113 - 2.671	0.321 - 8.918	3.474	0.226	1.033	0.040
	1200	6	0.995	0.064 - 1.346	0.498 - 8.862	6.847	0.758	1.001	0.052
	1175	6	0.997	0.070 - 1.447	0.969 - 13.294	9.920	0.648	0.860	0.031
	1160	5	0.996	0.068 - 0.806	1.241 - 11.166	13.129	1.341	0.861	0.045
	1150	4	0.997	0.063 - 0.497	1.496 - 10.302	18.456	2.407	0.922	0.051
	1140	4	0.995	0.068 - 0.535	2.271 - 12.906	20.214	3.167	0.833	0.062
	1130	3	1.000	0.063 - 0.239	2.382 - 8.752	34.888	2.859	0.975	0.029
N33B	1350	35	0.996	2.032 - 6.260	0.470 - 2.160	0.197	0.004	1.290	0.021
	1325	40	0.998	1.050 - 6.602	0.378 - 3.375	0.370	0.003	1.172	0.011
	1300	50	0.997	0.471 - 7.316	0.337 - 5.327	0.705	0.007	1.000	0.010
	1275	60	0.998	0.249 - 7.907	0.349 - 8.370	1.162	0.009	0.920	0.007
	1250	50	0.998	0.244 - 5.910	0.594 - 11.286	2.044	0.016	0.932	0.008
	1225	41	0.998	0.252 - 3.790	1.078 - 12.690	3.821	0.033	0.905	0.008
	1200	55	0.998	0.057 - 1.863	0.448 - 13.698	7.085	0.127	0.980	0.009
	1180	42	0.998	0.061 - 1.295	0.774 - 12.132	10.220	0.242	0.924	0.010
	1160	26	0.998	0.062 - 0.792	1.220 - 12.456	16.331	0.421	0.937	0.011
	1140	28	0.997	0.063 - 0.377	2.142 - 11.466	29.109	1.004	0.953	0.014
	1120	19	0.996	0.065 - 0.203	3.492 - 9.630	37.565	2.146	0.878	0.020

Table 3.(cont) Rheometric measurements

Sample *	T (° C) **	N †	r ††	Shear Rate Range (s^{-1}) ‡	Shear Stress Range (Pa /10^5) ‡‡	m /10^5 (Pa s^n) §	σ_m	n	σ_n
N34	1300	50	0.995	0.624 - 6.540	0.233 - 3.147	0.441	0.005	1.094	0.015
	1275	50	0.998	0.727 - 7.403	0.495 - 4.313	0.696	0.005	0.926	0.008
	1250	50	0.998	0.227 - 5.452	0.235 - 6.280	1.192	0.012	1.011	0.009
	1225	50	0.999	0.114 - 4.173	0.258 - 8.123	2.111	0.023	0.971	0.007
	1200	50	0.999	0.058 - 2.482	0.242 - 8.553	3.711	0.049	0.935	0.007
	1175	40	0.999	0.055 - 1.269	0.477 - 8.553	6.577	0.115	0.925	0.008
	1150	35	0.999	0.058 - 0.789	0.947 - 9.413	11.475	0.177	0.889	0.007
	1125	35	0.999	0.011 - 0.368	0.324 - 9.107	24.085	0.718	0.938	0.009
	1100	22	0.998	0.011 - 0.168	0.583 - 9.456	62.458	3.585	1.015	0.014
	1080	15	0.998	0.011 - 0.061	1.162 - 6.848	116.630	8.951	1.011	0.017
	1060	11	0.997	0.010 - 0.050	2.113 - 11.365	227.630	28.378	1.024	0.027
	1040	10	0.988	0.010 - 0.025	3.555 - 8.845	430.290	70.913	1.043	0.034
N41	1300	40	0.996	0.620 - 5.665	0.152 - 2.199	0.290	0.004	1.175	0.017
	1275	44	0.993	0.664 - 6.786	0.275 - 3.279	0.479	0.007	1.052	0.019
	1250	40	0.997	0.318 - 4.520	0.205 - 4.095	0.850	0.009	1.073	0.013
	1225	45	0.997	0.212 - 4.944	0.182 - 7.485	1.232	0.019	1.124	0.014
	1200	50	0.995	0.111 - 3.442	0.243 - 7.957	1.979	0.049	1.031	0.015
	1175	50	0.997	0.058 - 2.402	0.252 - 9.876	3.672	0.083	0.977	0.011
	1150	40	0.997	0.054 - 1.205	0.456 - 9.660	7.554	0.193	0.983	0.012
	1125	45	0.998	0.010 - 0.687	0.116 - 10.860	16.072	0.448	1.020	0.009
	1100	34	0.998	0.012 - 0.377	0.316 - 8.925	22.862	0.816	0.930	0.011
	1075	25	0.998	0.008 - 0.181	0.397 - 10.196	61.675	2.833	1.020	0.012
	1050	15	1.000	0.010 - 0.058	1.328 - 8.237	155.550	3.528	1.034	0.005
	1025	14	0.995	0.011 - 0.046	2.959 - 10.540	216.710	27.164	0.963	0.028

Table 3.(cont) Rheometric measurements

Sample *	T (° C) **	N †	r ††	Shear Rate Range (s^{-1}) ‡	Shear Stress Range (Pa /10^5) ‡‡	m /10^5 (Pa s^n) §	σ_m	n	σ_n
N50A	1275	4	0.998	2.038 - 6.081	0.388 - 2.068	0.129	0.008	1.514	0.070
	1250	6	0.986	0.686 - 7.522	0.262 - 3.120	0.316	0.025	1.048	0.090
	1225	7	0.994	0.450 - 7.632	0.272 - 5.343	0.680	0.034	1.031	0.051
	1200	8	0.998	0.249 - 8.206	0.375 - 7.885	1.194	0.028	0.888	0.020
	1150	6	0.999	0.066 - 1.408	0.371 - 5.946	4.496	0.235	0.897	0.024
	1125	5	0.998	0.065 - 0.769	0.776 - 6.963	8.776	0.674	0.904	0.033
	1100	4	0.994	0.063 - 0.485	1.287 - 8.186	16.262	3.106	0.936	0.074
	1075	3	0.999	0.058 - 0.217	2.137 - 8.747	43.812	5.009	1.064	0.039
	1060	3	1.000	0.065 - 0.248	3.749 - 10.987	33.660	0.414	0.804	0.004
N50B	1220	57	0.996	0.523 - 8.274	0.527 - 6.245	0.999	0.009	0.841	0.010
	1200	75	0.999	0.126 - 8.001	0.233 - 8.818	1.507	0.011	0.844	0.005
	1180	75	0.999	0.131 - 7.980	0.466 - 14.746	2.538	0.019	0.847	0.005
	1160	65	0.999	0.126 - 6.321	0.608 - 18.884	3.647	0.023	0.875	0.004
	1140	46	0.999	0.126 - 2.584	1.046 - 14.370	6.010	0.066	0.886	0.007
	1120	45	0.999	0.063 - 2.002	0.798 - 17.545	9.330	0.098	0.859	0.005
	1100	35	0.998	0.060 - 0.771	1.279 - 13.302	15.945	0.412	0.910	0.011
	1080	30	0.999	0.063 - 0.520	2.167 - 14.325	24.813	0.530	0.881	0.009
	1060	25	0.999	0.058 - 0.353	3.476 - 20.841	59.645	1.275	0.994	0.008
	1050	15	0.998	0.060 - 0.190	5.116 - 14.506	69.051	3.652	0.920	0.018
	1040	15	0.999	0.055 - 0.179	6.139 - 19.291	103.130	2.926	0.977	0.009
	1030	10	1.000	0.055 - 0.121	8.366 - 18.553	158.000	4.163	1.009	0.008

Table 3.(cont) Rheometric measurements

Sample *	T (° C) **	N †	r ††	Shear Rate Range (s^{-1}) ‡	Shear Stress Range (Pa /10^5) ‡‡	m /10^5 (Pa s^n) §	σ_m	n	σ_n
N50C	1250	50	0.995	0.754 - 7.600	0.285 - 2.366	0.410	0.004	0.901	0.013
	1225	55	0.995	0.334 - 7.015	0.163 - 3.801	0.572	0.007	1.001	0.014
	1200	55	0.997	0.348 - 7.248	0.281 - 5.842	0.918	0.009	0.959	0.010
	1175	35	0.998	0.226 - 3.562	0.346 - 5.768	1.643	0.019	1.001	0.010
	1150	50	0.998	0.062 - 2.607	0.226 - 6.966	2.848	0.042	0.879	0.008
	1125	39	0.999	0.062 - 1.336	0.438 - 6.470	4.998	0.063	0.871	0.006
	1100	35	0.997	0.064 - 0.836	0.850 - 8.393	9.155	0.231	0.842	0.011
	1080	35	0.996	0.010 - 0.363	0.203 - 7.764	21.266	1.022	0.956	0.014
	1060	25	0.998	0.009 - 0.188	0.373 - 7.616	41.141	2.189	0.967	0.014
	1040	20	0.998	0.007 - 0.123	0.592 - 9.346	77.554	4.161	0.993	0.013
	1020	15	0.998	0.009 - 0.060	1.497 - 9.280	151.710	12.059	0.983	0.018
	1000	10	0.993	0.011 - 0.026	3.512 - 8.688	351.390	73.690	1.016	0.044
N60A	1280	3	0.979	2.914 - 6.008	0.397 - 1.240	0.065	0.021	1.611	0.338
	1260	4	0.990	2.147 - 6.407	0.376 - 1.610	0.123	0.015	1.375	0.142
	1230	5	0.993	1.212 - 7.156	0.303 - 2.404	0.264	0.017	1.133	0.078
	1200	6	0.992	0.741 - 8.134	0.435 - 4.600	0.659	0.035	0.935	0.060
	1170	7	0.998	0.468 - 7.832	0.517 - 8.206	1.144	0.033	0.982	0.030
	1140	10	0.997	0.071 - 5.812	0.314 - 10.558	2.463	0.091	0.832	0.021
	1100	7	0.996	0.064 - 1.378	0.680 - 11.290	8.427	0.757	0.956	0.040
	1060	4	0.995	0.063 - 0.462	1.610 - 11.540	27.013	5.317	1.029	0.076
	1040	3	0.994	0.068 - 0.271	3.387 - 10.349	29.304	3.546	0.809	0.043

Table 3.(cont) Rheometric measurements

Sample *	T (° C) **	N †	r ††	Shear Rate Range (s^{-1}) ‡	Shear Stress Range (Pa /10^5) ‡‡	m /10^5 (Pa s^n) §	σ_m	n	σ_n
N60B	1280	2	-	3.495 - 5.261	0.402 - 0.946	0.029	0.007	2.090	0.001
	1260	4	0.995	2.039 - 5.879	0.282 - 1.495	0.085	0.008	1.600	0.108
	1230	5	0.991	1.138 - 6.756	0.282 - 2.770	0.241	0.020	1.268	0.101
	1200	6	0.993	0.710 - 7.851	0.470 - 4.662	0.683	0.034	0.989	0.058
	1150	8	0.998	0.116 - 5.403	0.261 - 9.094	2.182	0.086	0.926	0.027
	1100	6	0.998	0.066 - 1.398	0.700 - 12.021	8.688	0.493	0.925	0.027
	1060	4	0.996	0.073 - 0.521	2.718 - 13.171	23.712	3.074	0.820	0.051
N60C	1280	3	1.000	2.602 - 5.324	0.261 - 1.134	0.036	0.002	2.055	0.053
	1260	4	0.984	2.215 - 6.538	0.376 - 1.641	0.120	0.018	1.339	0.173
	1230	5	0.999	1.228 - 6.980	0.387 - 2.990	0.311	0.006	1.162	0.025
	1200	6	0.992	0.710 - 7.902	0.464 - 5.122	0.695	0.038	0.985	0.062
	1150	8	0.997	0.133 - 5.628	0.345 - 8.624	2.240	0.094	0.881	0.029
	1100	11	0.999	0.067 - 1.459	0.732 - 11.812	8.005	0.234	0.899	0.014
	1060	4	0.998	0.060 - 0.500	2.530 - 14.060	23.239	2.405	0.796	0.040

* Sample numbers correspond to those given for viscometric experiments in Table 1.

** Temperature of each experiment

† Number of data points in the log Ω - log τ regression

†† Correlation coefficient of the log Ω - log τ regression.

‡ Maximum and minimum values of shear rate (in s^{-1})

‡‡ Shear stress (in Pa/10^5) at each temperature

§ Power law parameters m and n, and their 1σ uncertainties. The units for m are Pa s^n.