

Table 4 Total Dissolved H<sub>2</sub>O, H<sub>2</sub>O(m), and OH<sup>-</sup> Concentrations in Fe-free Glasses Based on Infrared Absorbance

Sample	Thickness (cm)	Abs.3570 <sup>□</sup>	Abs.4500 <sup>†</sup>	Abs.5200 <sup>‡</sup>	Abs.1630 <sup>§</sup>	H <sub>2</sub> O <sub>total</sub> <sup>  </sup>		H <sub>2</sub> O(m) <sup>□□</sup>		H <sub>2</sub> O <sub>total</sub> <sup>§§</sup> 4500+5200
						3570	4500	5200	1630	
run58a-1s1	0.0024	1.284	0.0071	0.0166	0.542	5.73	2.46	3.51	3.22	5.97
run58a-1s2	0.0024	1.298	0.0097	0.0153	0.552	5.79	2.40	3.24	3.28	5.64
run58a-1s3	0.0024	1.312	0.0079	0.0150	0.559	5.86	2.74	3.17	3.32	5.91
run58a-1s5	0.0024	1.097	0.0050	0.0170	0.462	4.90	1.74	3.60	2.75	5.34
run58a-1s6	0.0024	1.019	0.0052	0.0181	0.431	4.55	1.80	3.83	2.56	5.63
run58a-1s7	0.0024	1.250	0.0050	0.0160	0.534	5.58	1.74	3.38	3.16	5.12
run58a-1s8	0.0024	1.090	0.0060	0.0140	0.467	4.87	2.08	2.96	2.73	5.04
run58a-1s9	0.0024	1.185	0.0050	0.0140	0.504	5.29	1.74	2.96	3.00	4.70
r58a-1s1319	0.0024	1.130	0.0050	0.0110	0.479	5.04	1.74	2.33	2.84	4.07
r58a-1s2319	0.0024	1.321	0.0060	0.0110	0.545	5.90	2.08	2.33	3.23	4.41
r58a-1s3319	0.0024	1.284	0.0060	0.0110	0.530	5.73	2.08	2.33	3.14	4.41
run58a-2s2	0.0044	2.242	0.0127	0.0279	1.061	5.46	2.40	3.22	3.43	5.62
run58a-2s3	0.0044	2.252	0.0134	0.0269	1.072	5.48	2.54	3.10	3.47	5.64
run58a-2s4	0.0044	2.267	0.0132	0.0294	1.080	5.52	2.50	3.39	3.50	5.89
run58a-3s1	0.0031	1.681	0.0093	0.0259	0.733	5.81	2.50	4.24	3.37	6.74
run58a-3s2	0.0031	1.797	0.0087	0.0244	0.779	6.21	2.34	4.00	3.58	6.34
run58a-3s3	0.0031	1.835	0.0095	0.0213	0.796	6.34	2.55	3.49	3.66	6.04
run58a-3s4	0.0031	1.892	0.0092	0.0241	0.815	6.54	2.47	3.95	3.74	6.42
run58a-4s1	0.0015	0.841	0.0047	0.0088	0.361	6.00	2.61	2.98	3.43	5.59
run58a-4s2	0.0015	0.860	0.0047	0.0085	0.373	6.14	2.61	2.88	3.54	5.49
run58a-5s1	0.0029	1.556	0.0086	0.0176	0.664	6.67	2.86	3.57	3.78	6.43
run58a-5s2	0.0029	1.586	-	0.0188	0.684	6.79	-	3.82	3.90	-
run58a-5s3	0.0029	1.378	0.0074	0.0185	0.591	5.90	2.46	3.76	3.37	6.22
run58a-6s1	0.0020	1.185	-	-	0.514	6.35	-	-	3.66	-
run58a-6s2	0.0020	1.136	0.0065	0.0162	0.485	6.08	2.71	4.11	3.45	6.82
run58a-6s3	0.0020	1.179	-	0.0151	0.506	6.31	-	3.83	3.60	-
r58a-6s1319	0.0020	1.175	0.0086	0.0100	0.483	6.29	3.58	2.54	3.44	6.12
r58a-6s2319	0.0020	1.201	0.0060	0.0160	0.494	6.43	2.50	4.06	3.52	6.56
r58a-6s3320	0.0020	1.173	0.0080	0.0110	0.481	6.28	3.33	2.79	3.42	6.12
run58a-7s1	0.0041	2.172	0.0125	0.0270	1.020	5.67	2.54	3.34	3.54	5.88
run58a-7s2	0.0041	2.197	0.0116	0.0307	1.010	5.74	2.36	3.80	3.51	6.16
run58a-7s3	0.0041	2.157	0.0122	0.0309	0.997	5.64	2.48	3.83	3.46	6.31
run58a-8s1	0.0129	-	0.0360	0.0830	-	-	2.32	3.27	-	5.59
run58a-8s2	0.0129	-	0.0360	0.0850	-	-	2.32	3.34	-	5.66
run58a-8s3	0.0129	-	0.0360	0.0800	-	-	2.32	3.15	-	5.47
run58a-9s1	0.0048	2.391	0.0153	0.0330	1.294	5.34	2.66	3.49	3.84	6.15
run58a-9s2	0.0048	2.384	0.0149	0.0308	1.250	5.32	2.58	3.26	3.71	5.84
run58a-9s3	0.0048	2.419	0.0150	0.0331	1.282	5.40	2.60	3.50	3.80	6.10
r58a-92s1320	0.0048	2.585	0.0130	0.0320	1.270	5.77	2.26	3.38	3.77	5.64
r58a-92s2320	0.0048	2.550	0.0150	0.0310	1.256	5.69	2.60	3.28	3.73	5.88
r58a-91s2320	0.0048	2.587	0.0150	0.0320	1.267	5.77	2.60	3.38	3.76	5.98
r58a-91s3320	0.0048	2.493	0.0160	0.0320	1.306	5.56	2.78	3.38	3.88	6.16
r58a-10s1	0.0046	2.216	0.0111	0.0300	1.011	5.27	2.05	3.38	3.20	5.43
r58a-10s2	0.0046	2.275	0.0137	0.0314	1.115	5.42	2.54	3.54	3.53	6.08
r58a-10s3	0.0046	2.260	0.0127	0.0302	1.087	5.38	2.35	3.41	3.44	5.76
r58a-12s1sh	0.0039	2.239	0.0110	0.0250	1.066	6.14	2.35	3.26	3.89	5.61
r58a-12s2sh	0.0039	2.361	0.0120	0.0260	1.038	6.48	2.56	3.38	3.79	5.94
r58a-12s3sh	0.0039	2.156	0.0110	0.0220	0.946	5.92	2.35	2.86	3.45	5.21
r58a-12s4sh	0.0039	2.252	0.0100	0.0250	1.010	6.18	2.14	3.26	3.69	5.40
r58a-12s5sh	0.0039	2.275	0.0110	0.0250	1.039	6.25	2.35	3.26	3.79	5.61
r58a-12s6sh	0.0039	2.264	0.0120	0.0250	0.986	6.22	2.56	3.26	3.60	5.82
r58a-13s1	0.0048	2.538	0.0130	0.0360	1.194	5.66	2.26	3.81	3.54	6.07
r58a-13s2	0.0048	2.426	0.0130	0.0310	1.154	5.41	2.26	3.28	3.42	5.54
r58a-13s3	0.0048	2.467	0.0120	0.0330	1.126	5.50	2.08	3.49	3.34	5.57
r58a-13s4	0.0048	2.478	0.0120	0.0320	1.202	5.53	2.08	3.38	3.57	5.46
r58a-13s6	0.0048	2.500	0.0140	0.0300	1.195	5.58	2.43	3.17	3.55	5.60
r58a-13s7	0.0048	2.492	0.0150	0.0330	1.253	5.56	2.60	3.49	3.72	6.09
r58a-14s1	0.0031	1.563	0.0080	0.0270	0.690	5.40	2.15	4.42	3.17	6.57
r58a-14s2	0.0037	1.949	0.0100	0.0250	0.858	5.64	2.25	3.43	3.30	5.68
r58a-14s3	0.0037	1.925	0.0100	0.0260	0.840	5.57	2.25	3.57	3.23	5.82
r58a-14s4	0.0037	1.995	0.0110	0.0230	0.860	5.78	2.48	3.16	3.31	5.64
r58a-14s5	0.0037	1.922	0.0100	-	0.879	5.56	2.25	-	3.38	-
r58a-14s6	0.0037	1.923	0.0100	0.0240	0.860	5.57	2.25	3.29	3.31	5.54
r12c3shs1	0.0068	-	0.0230	0.0310	1.073	-	2.81	2.31	2.24	5.12
r12c3sh2s1	0.0024	1.078	-	-	0.377	4.80	-	-	2.23	-
r12c3sh2s2	0.0024	1.002	-	-	0.358	4.47	-	-	2.12	-
r12c3sh2s3	0.0024	1.068	-	-	0.378	4.76	-	-	2.24	-
r12c3sh2s4	0.0024	1.018	-	-	0.360	4.54	-	-	2.13	-
r12c3sh2s5	0.0024	1.010	-	-	0.404	4.50	-	-	2.39	-
r12c3sh2s6	0.0024	1.056	-	-	0.403	4.71	-	-	2.39	-
r12c3sh2s7	0.0024	1.038	-	-	0.399	4.63	-	-	2.36	-
r12c3sh2s8	0.0024	1.041	-	-	0.389	4.64	-	-	2.30	-
r12c1s1119	0.0124	-	0.0290	0.0450	1.874	-	1.94	1.84	2.15	3.79
r12c1s2119	0.0124	-	0.0340	0.0450	1.870	-	2.28	1.84	2.14	4.12
r12c1s3119	0.0124	-	0.0310	0.0450	1.898	-	2.08	1.84	2.18	3.92
r12c1s4119	0.0124	-	0.0320	0.0470	1.913	-	2.14	1.92	2.19	4.07

r68c1s1	0.0089	1.678	0.0160	0.0140	0.359	1.99	1.48	0.79	0.57	2.27
r68c1s2	0.0089	1.712	0.0170	0.0110	0.376	2.03	1.57	0.62	0.59	2.19
r68c1s3	0.0089	1.678	0.0160	0.0110	0.366	1.99	1.48	0.62	0.58	2.10
r68c1s1324	0.0089	1.720	0.0170	0.0100	0.356	2.04	1.57	0.56	0.56	2.13
r68c1s2324	0.0089	1.769	0.0168	0.0081	0.361	2.10	1.55	0.46	0.57	2.01
r68c1s3324	0.0089	1.764	0.0171	0.0092	0.370	2.10	1.58	0.52	0.58	2.10
r68c1s4324	0.0089	1.778	0.0160	0.0110	0.372	2.11	1.48	0.62	0.59	2.10
r68c1s1119	0.0089	1.788	0.0150	0.0083	0.379	2.12	1.38	0.47	0.60	1.85
r68c1s2119	0.0089	1.687	0.0183	0.0072	0.354	2.00	1.69	0.40	0.56	2.09
r68c1s3119	0.0089	1.754	0.0169	0.0084	0.358	2.08	1.56	0.47	0.56	2.03
r68c1s4119	0.0089	1.715	0.0163	0.0088	0.357	2.04	1.50	0.50	0.56	2.00
run106c1s1	0.0077	0.931	0.0100	0.0020	0.132	1.27	1.10	0.20	0.24	1.30
run106c1s2	0.0077	0.941	0.0110	0.0030	0.125	1.28	1.17	0.19	0.23	1.36
run106c2s1	0.0082	0.862	0.0100	0.0020	0.120	1.10	1.06	0.18	0.20	1.24
run106c2s2	0.0082	0.970	0.0110	0.0020	0.131	1.24	1.09	0.19	0.22	1.28
run106c2s3	0.0082	0.969	0.0110	0.0030	0.137	1.24	1.09	0.18	0.23	1.27
r106c1s1119	0.0077	0.916	0.0109	0.0033	0.118	1.25	1.16	0.21	0.21	1.37
r106c1s2119	0.0077	0.893	0.0086	0.0029	0.111	1.22	0.91	0.19	0.20	1.10
r106c1s3119	0.0077	0.937	0.0090	-	0.119	1.28	0.95	-	0.22	-
r106c2s1119	0.0082	0.873	0.0123	0.0029	0.120	1.12	1.22	0.18	0.20	1.40
r106c2s2119	0.0082	0.953	0.0110	0.0037	0.133	1.22	1.09	0.22	0.23	1.31
r106c2s3119	0.0082	0.892	0.0113	-	0.126	1.14	1.12	-	0.21	-

Notes: □ Background corrected absorbance at  $3570 \pm 20 \text{ cm}^{-1}$ ; † Background corrected absorbance at  $4500 \pm 10 \text{ cm}^{-1}$

‡ Background corrected absorbance at  $5200 \pm 10 \text{ cm}^{-1}$ ; § Background corrected absorbance at  $1630 \pm 10 \text{ cm}^{-1}$ ;

|| Concentration (weight %) of total dissolved  $\text{H}_2\text{O}$  based on  $3570 \text{ cm}^{-1}$  absorbance and  $\square_{3570} = 69.21 \text{ L/mol cm}$ ;

#Concentration of dissolved  $\text{H}_2\text{O}$  as  $\text{OH}^{-1}$  based on  $4500 \text{ cm}^{-1}$  absorbance and  $\square_{4500} = 0.89 \text{ L/mol cm}$ ;

□□Concentration (weight %) of dissolved  $\text{H}_2\text{O}$  as molecular  $\text{H}_2\text{O}$  based on  $5200 \text{ cm}^{-1}$  absorbance and  $\square_{5200} = 1.46 \text{ L/mol cm}$ ;

††Concentration (weight %) of dissolved  $\text{H}_2\text{O}$  as molecular  $\text{H}_2\text{O}$  based on  $1630 \text{ cm}^{-1}$  absorbance and  $\square_{1630} = 52.05 \text{ L/mol cm}$ ;

‡‡ Concentration (weight %) of total dissolved  $\text{H}_2\text{O}$  based on summation of  $\text{OH}^{-1}$  (#) and molecular  $\text{H}_2\text{O}$  (□□).