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Electronic Supporting Information

Properties of fluorosulfate-based ionic liquids and geometries of $(FO_2SOH)OSO_2F^-$ and $(FO_2SOH)_2O_2SOF^-$

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Table S1. Calculated geometrical parameters for $HOSO_2F$, SO_3F^-, $(FO_2SOH)OSO_2F^-$, $(FO_2SOH)_2O_2SOF^-$, and $SO_3CF_3^-$ [a]

	HF		B3LYP		PBE1PBE		MPW1PW91		MP2	
	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ
					$HOSO_2F$ (C_1)					
S−O1	1.389	1.390	1.423	1.424	1.417	1.418	1.417	1.417	1.421	1.424
S−O2	1.397	1.397	1.431	1.432	1.425	1.426	1.424	1.425	1.429	1.432
S−O3	1.539	1.539	1.592	1.593	1.578	1.578	1.578	1.578	1.582	1.584
S−F	1.518	1.519	1.586	1.589	1.569	1.571	1.569	1.571	1.570	1.575
O3−H	0.948	0.948	0.970	0.970	0.967	0.967	0.966	0.966	0.969	0.971
O1−S−O2	123.5	123.4	124.6	124.5	124.5	124.4	124.4	124.4	124.8	124.8
O2−S−O3	109.7	109.7	110.0	110.2	109.9	110.0	109.9	110.0	109.8	110.0
O3−S−O1	108.3	108.3	107.6	107.5	107.7	107.6	107.7	107.7	107.5	107.4
O1−S−F	107.0	107.0	106.8	106.8	106.8	106.8	106.8	106.8	106.8	106.8
O2−S−F	106.5	106.5	106.2	106.2	106.2	106.2	106.3	106.2	106.2	106.2
O3−S−F	99.0	99.1	98.5	98.5	98.6	98.7	98.6	98.6	98.4	98.4
S−O3−H	111.7	111.8	109.1	109.3	108.8	108.9	108.9	109.1	107.8	108.2
					SO_3F^- (C_{3v})					
S−O	1.424	1.425	1.459	1.461	1.452	1.453	1.451	1.453	1.455	1.460
S−F	1.577	1.576	1.666	1.670	1.642	1.645	1.644	1.646	1.646	1.652
O−S−O	115.4	115.4	115.8	115.8	115.7	115.7	115.7	115.7	115.8	115.8
O−S−F	102.5	102.6	102.0	102.0	102.1	102.1	102.1	102.1	102.0	101.9

$(FO_2SOH)OSO_2F^-$ (C_1)

S1-O11	1.413	1.415	1.442	1.445	1.435	1.436	1.434	1.435	1.438	1.443
S1-O12	1.416	1.417	1.443	1.447	1.436	1.437	1.435	1.436	1.440	1.445
S1-O13	1.447	1.447	1.508	1.500	1.500	1.500	1.499	1.499	1.503	1.501
S1-F1	1.557	1.557	1.623	1.631	1.602	1.604	1.603	1.605	1.604	1.613
O13-H	1.476	1.486	1.215	1.285	1.198	1.199	1.198	1.198	1.198	1.243
S2-O21	1.402	1.402	1.441	1.440	1.435	1.436	1.434	1.435	1.438	1.440
S2-O22	1.401	1.402	1.442	1.441	1.436	1.437	1.435	1.436	1.440	1.442
S2-O23	1.495	1.496	1.510	1.519	1.500	1.500	1.499	1.499	1.503	1.511
S2-F2	1.533	1.533	1.621	1.620	1.602	1.604	1.603	1.605	1.604	1.606
O23-H	1.015	1.012	1.194	1.137	1.198	1.197	1.198	1.198	1.198	1.160
O11-S1-O12	117.5	117.4	119.6	119.1	119.6	119.6	119.6	119.6	119.9	119.6
O12-S1-O13	113.9	114.0	114.0	114.2	113.9	114.0	113.9	114.0	113.8	113.9
O13-S1-O11	113.7	113.7	111.5	112.2	111.4	111.4	111.4	111.4	111.4	112.0
O11-S1-F1	103.8	103.8	104.2	103.9	104.4	104.3	104.4	104.3	104.3	104.0
O12-S1-F1	103.8	103.7	104.1	103.8	104.2	104.1	104.2	104.1	104.1	103.9
O13-S1-F1	101.6	101.6	100.6	100.8	100.7	100.7	100.7	100.7	100.5	100.6
S1-O13-H	128.3	129.4	119.8	121.8	118.8	119.5	119.2	119.9	116.2	117.5
O21-S2-O22	120.4	120.4	119.7	120.2	119.6	119.6	119.6	119.6	119.9	120.2
O22-S2-O23	113.1	113.1	114.0	114.0	113.9	114.0	113.9	114.0	113.8	113.8
O23-S2-O21	109.4	109.3	111.3	110.6	111.4	111.4	111.4	111.4	111.4	111.0
O21-S2-F2	105.7	105.7	104.3	104.6	104.4	104.3	104.4	104.3	104.3	104.4
O22-S2-F2	105.4	105.4	104.2	104.4	104.2	104.2	104.2	104.1	104.1	104.2

O23-S2-F2	100.5	100.6	100.6	100.5	100.7	100.7	100.7	100.7	100.5	100.4
S2-O23-H	117.5	117.7	119.4	118.7	118.8	119.4	119.2	119.9	116.2	116.1
O13-H-O23	177.4	177.6	179.9	179.6	180.0	179.6	180.0	180.0	180.0	179.8

$(FO_2SOH)OSO_2F^-$ (C_i)

S-O1	1.407	1.408	1.441	1.443	1.435	1.436	1.434	1.435	1.438	1.441
S-O2	1.409	1.410	1.443	1.444	1.436	1.437	1.435	1.436	1.440	1.443
S-O3	1.468	1.468	1.509	1.509	1.499	1.500	1.499	1.499	1.503	1.506
S-F	1.546	1.545	1.622	1.626	1.602	1.604	1.603	1.605	1.604	1.610
O3-H	1.185	1.185	1.204	1.205	1.197	1.198	1.198	1.198	1.198	1.200
O1-S-O2	118.9	118.9	119.7	119.6	119.6	119.6	119.6	119.6	119.9	119.9
O2-S-O3	113.6	113.6	114.0	114.1	113.9	114.0	114.0	114.0	113.8	113.9
O3-S-O1	111.7	111.7	111.4	111.4	111.4	111.4	111.4	111.4	111.4	111.5
O1-S-F	104.7	104.7	104.3	104.2	104.3	104.3	104.3	104.3	104.3	104.2
O2-S-F	104.5	104.5	104.1	104.0	104.2	104.1	104.2	104.1	104.1	104.0
O3-S-F	101.1	101.1	100.6	100.6	100.7	100.7	100.7	100.7	100.5	100.5
S-O3-H	122.6	123.2	119.6	120.3	118.9	119.5	119.3	119.8	116.2	116.8
O3-H-O3	180	180	180	180	180	180	180	180	180	180

					$(FO_2SOH)_2O_2SOF^-$ (C_s)					
S1-O11	1.433	1.433	1.472	1.472	1.466	1.465	1.465	1.464	-	-
S1-O12	1.411	1.412	1.442	1.443	1.434	1.435	1.434	1.435	-	-
S1-F1	1.541	1.542	1.611	1.617	1.589	1.594	1.590	1.595	-	-
O11-H	1.576	1.582	1.487	1.493	1.455	1.461	1.460	1.465	-	-
S2-O21	1.399	1.399	1.434	1.435	1.427	1.428	1.427	1.428	-	-
S2-O22	1.399	1.400	1.435	1.436	1.429	1.430	1.428	1.429	-	-
S2-O23	1.504	1.505	1.543	1.544	1.530	1.531	1.530	1.531	-	-
S2-F2	1.530	1.530	1.605	1.607	1.587	1.589	1.588	1.589	-	-
O23-H	0.989	0.988	1.037	1.036	1.041	1.039	1.039	1.037	-	-
O11-S1-O12	115.8	115.8	116.7	116.8	116.6	116.7	116.6	116.7	-	-
O11-S1-O11 [b]	112.5	112.6	111.3	111.4	111.1	111.2	111.1	111.2	-	-
O11-S1-F1	102.8	102.8	102.5	102.4	102.6	102.5	102.6	102.5	-	-
O12-S1-F1	104.8	104.8	104.7	104.5	105.0	104.8	104.9	104.7	-	-
S1-O11-H	132.6	133.7	124.9	125.9	123.5	124.3	124.2	125.0	-	-
O21-S2-O22	121.1	121.0	121.7	121.7	121.6	121.5	121.5	121.5	-	-
O22-S2-O23	112.6	112.7	113.1	113.2	113.0	113.1	113.1	113.1	-	-
O23-S2-O21	108.9	108.9	108.9	108.8	109.0	109.0	109.0	109.0	-	-
O21-S2-F2	105.9	106.0	105.4	105.4	105.4	105.4	105.4	105.4	-	-
O22-S2-F2	105.7	105.7	105.2	105.1	105.2	105.1	105.2	105.1	-	-
O23-S2-F2	100.2	100.3	99.8	99.9	100.0	100.0	100.0	100.0	-	-
S2-O23-H	116.2	116.4	114.8	115.2	114.4	114.8	114.7	115.1	-	-
O13-H-O23	173.8	174.3	175.3	177.1	175.1	176.9	175.0	176.8	-	-

					$SO_3CF_3^-$ (C_{3v})					
S−O	1.429	1.430	1.466	1.467	1.458	1.460	1.458	1.459	1.462	1.466
S−C	1.833	1.837	1.884	1.893	1.860	1.867	1.863	1.870	1.853	1.859
C−F	1.319	1.318	1.351	1.350	1.341	1.341	1.341	1.341	1.345	1.345
O−S−O	115.4	115.3	115.6	115.5	115.5	115.5	115.5	115.5	115.7	115.7
O−S−C	102.6	102.7	102.3	102.4	102.4	102.5	102.4	102.5	102.1	102.2
F−C−F	107.1	107.1	106.8	106.9	107.0	107.1	106.9	107.0	106.9	107.0
S−C−F	111.8	111.7	112.0	111.9	111.9	111.7	111.9	111.8	111.9	111.8

[a] Bond lengths and angles are given in Å and deg., respectively. Symbols of atoms are shown in Figure 1. [b] The two O11 oxygen atoms are different atoms.

Table S2. Mulliken and Natural Bond Orbital (NBO) charges for $HOSO_2F$, SO_3F^-, $(FO_2SOH)OSO_2F^-$, $(FO_2SOH)_2O_2SOF^-$, and $SO_3CF_3^-$ [a]

	B3LYP				PBE1PBE				MPW1PW91			
	cc-pVTZ		aug-cc-pVTZ		cc-pVTZ		aug-cc-pVTZ		cc-pVTZ		aug-cc-pVTZ	
	Mulliken	NBO	Mulliken	NBO	Mulliken	NBO	Mulliken	NBO	Mulliken	NBO	Mulliken	NBO
					$HOSO_2F$ (C_1)							
S	1.056	2.549	2.105	2.546	0.989	2.546	1.957	2.544	1.010	2.550	2.069	2.548
F	−0.215	−0.480	−0.444	−0.477	−0.193	−0.473	−0.412	−0.470	−0.198	−0.474	−0.433	−0.471
O1	−0.407	−0.876	−0.724	−0.877	−0.396	−0.880	−0.688	−0.881	−0.401	−0.881	−0.723	−0.882
O2	−0.381	−0.852	−0.699	−0.853	−0.369	−0.854	−0.664	−0.856	−0.375	−0.856	−0.697	−0.858
O3	−0.287	−0.851	−0.414	−0.852	−0.267	−0.853	−0.372	−0.853	−0.266	−0.853	−0.383	−0.853
H	0.235	0.510	0.177	0.513	0.236	0.514	0.180	0.517	0.230	0.513	0.167	0.516
					SO_3F^- (C_{3v})							
S	1.017	2.542	2.008	2.536	0.958	2.541	1.880	2.537	0.982	2.546	1.985	2.541
F	−0.359	−0.576	−0.530	−0.573	−0.333	−0.567	−0.493	−0.563	−0.339	−0.568	−0.509	−0.565
O	−0.553	−0.989	−0.826	−0.988	−0.542	−0.992	−0.796	−0.991	−0.548	−0.993	−0.826	−0.992

$(FO_2SOH)OSO_2F^-$ (C_1)

S1	1.041	2.570	2.116	2.567	0.975	2.567	1.952	2.566	0.998	2.571	2.066	2.571
S2	1.041	2.570	2.103	2.568	0.975	2.567	1.952	2.567	0.998	2.571	2.066	2.571
F1	−0.290	−0.529	−0.508	−0.532	−0.264	−0.520	−0.469	−0.517	−0.270	−0.521	−0.488	−0.518
F2	−0.287	−0.527	−0.499	−0.519	−0.264	−0.520	−0.469	−0.517	−0.270	−0.521	−0.488	−0.518
O11	−0.476	−0.932	−0.832	−0.938	−0.463	−0.933	−0.786	−0.934	−0.469	−0.935	−0.821	−0.936
O12	−0.479	−0.932	−0.820	−0.940	−0.465	−0.933	−0.776	−0.933	−0.471	−0.934	−0.811	−0.934
O13	−0.450	−0.940	−0.634	−0.961	−0.419	−0.936	−0.490	−0.938	−0.425	−0.938	−0.528	−0.939
O21	−0.473	−0.930	−0.812	−0.925	−0.463	−0.933	−0.785	−0.934	−0.469	−0.935	−0.821	−0.936
O22	−0.475	−0.929	−0.800	−0.921	−0.465	−0.933	−0.777	−0.933	−0.471	−0.934	−0.811	−0.934
O23	−0.441	−0.934	−0.521	−0.918	−0.419	−0.936	−0.488	−0.938	−0.425	−0.938	−0.529	−0.939
H	0.289	0.513	0.206	0.517	0.274	0.511	0.136	0.512	0.274	0.511	0.164	0.513

$(FO_2SOH)OSO_2F^-$ (C_i)

S	1.041	2.570	2.101	2.568	0.974	2.567	1.952	2.567	0.997	2.572	2.066	2.571
F	−0.288	−0.528	−0.504	−0.525	−0.264	−0.520	−0.469	−0.517	−0.270	−0.521	−0.488	−0.518
O1	−0.475	−0.931	−0.820	−0.931	−0.463	−0.933	−0.786	−0.934	−0.469	−0.935	−0.821	−0.936
O2	−0.477	−0.930	−0.811	−0.930	−0.465	−0.933	−0.776	−0.933	−0.471	−0.934	−0.810	−0.934
O3	−0.445	−0.937	−0.569	−0.938	−0.419	−0.936	−0.489	−0.938	−0.425	−0.937	−0.529	−0.939
H	0.289	0.513	0.204	0.515	0.274	0.511	0.136	0.512	0.274	0.511	0.162	0.513

$(FO_2SOH)_2O_2SOF^-$ (C_s)

S1	1.064	2.594	2.278	2.592	0.994	2.592	2.134	2.591	1.019	2.596	2.242	2.596
F1	−0.266	−0.515	−0.499	−0.516	−0.237	−0.504	−0.462	−0.505	−0.244	−0.506	−0.482	−0.506
O11	−0.499	−0.977	−0.783	−0.976	−0.473	−0.974	−0.702	−0.973	−0.482	−0.976	−0.747	−0.976
O12	−0.472	−0.925	−0.831	−0.925	−0.456	−0.924	−0.797	−0.925	−0.462	−0.926	−0.832	−0.927
H	0.276	0.531	0.216	0.533	0.269	0.528	0.170	0.530	0.269	0.529	0.193	0.530
S2	1.048	2.565	2.137	2.563	0.980	2.562	1.977	2.562	1.002	2.566	2.094	2.566
F2	−0.257	−0.507	−0.486	−0.503	−0.236	−0.500	−0.453	−0.496	−0.240	−0.501	−0.472	−0.497
O21	−0.441	−0.904	−0.799	−0.904	−0.430	−0.907	−0.763	−0.908	−0.435	−0.908	−0.800	−0.909
O22	−0.436	−0.898	−0.773	−0.898	−0.426	−0.902	−0.738	−0.903	−0.432	−0.903	−0.773	−0.904
O23	−0.353	−0.887	−0.486	−0.889	−0.335	−0.889	−0.427	−0.892	−0.337	−0.889	−0.459	−0.892

$SO_3CF_3^-$ (C_{3v})

S	0.867	2.296	1.986	2.292	0.806	2.291	1.840	2.288	0.827	2.295	1.940	2.293
C	0.379	0.752	0.845	0.756	0.353	0.735	0.796	0.740	0.366	0.739	0.856	0.743
O	−0.553	−0.993	−0.910	−0.993	−0.539	−0.994	−0.873	−0.994	−0.546	−0.995	−0.904	−0.995
F	−0.196	−0.356	−0.367	−0.357	−0.180	−0.348	−0.339	−0.349	−0.185	−0.350	−0.361	−0.350

[a] Symbols of atoms are shown in Figure 1.

Table S3. Natural Bond Orbital (NBO) bond orders for $HOSO_2F$, SO_3F^-, $(FO_2SOH)OSO_2F^-$, $(FO_2SOH)_2O_2SOF^-$, and $SO_3CF_3^-$ [a]

	B3LYP		PBE1PBE		MPW1PW91	
	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ
			$HOSO_2F$ (C_1)			
S−O1	1.153	0.594	1.163	0.590	1.162	0.589
S−O2	1.130	0.588	1.141	0.583	1.140	0.582
S−O3	0.746	0.408	0.763	0.410	0.762	0.409
S−F	0.603	0.262	0.622	0.265	0.658	0.264
O3−H	0.641	0.645	0.647	0.645	0.647	0.645
			SO_3F^- (C_{3v})			
S−O	1.047	0.566	1.060	0.622	1.059	0.622
S−F	0.496	0.235	0.519	0.317	0.517	0.315

$(FO_2SOH)OSO_2F^-$ (C_1)

S1-O11	1.098	1.069	1.110	1.083	1.109	1.082
S1-O12	1.093	1.065	1.106	1.080	1.105	1.079
S1-O13	0.916	0.904	0.925	0.889	0.925	0.8881
S1-F1	0.551	0.496	0.573	0.519	0.571	0.5174
O13-H	0.379	0.305	0.394	0.370	0.394	0.369
S2-O21	1.100	1.081	1.110	1.083	1.109	1.082
S2-O22	1.095	1.079	1.106	1.080	1.105	1.079
S2-O23	0.909	0.856	0.925	0.889	0.925	0.888
S2-F2	0.553	0.508	0.573	0.520	0.571	0.517
O23-H	0.396	0.424	0.394	0.371	0.394	0.369

$(FO_2SOH)OSO_2F^-$ (C_i)

S-O1	1.099	1.075	1.110	1.083	1.109	1.082
S-O2	1.094	1.072	1.106	1.080	1.105	1.079
S-O3	0.913	0.880	0.926	0.889	0.925	0.888
S-F	0.552	0.502	0.573	0.520	0.571	0.517
O3-H	0.388	0.368	0.394	0.370	0.394	0.369

			$(FO_2SOH)_2O_2SOF^-$ (C_s)			
S1-O11	1.008	0.980	1.016	0.984	1.017	0.984
S1-O12	1.099	1.075	1.112	1.086	1.111	1.082
S1-F1	0.567	0.509	0.591	0.529	0.589	0.527
O11-H	0.188	0.167	0.202	0.182	0.199	0.178
S2-O21	1.122	1.097	1.131	0.596	1.131	0.596
S2-O22	1.116	1.094	1.127	0.599	1.126	0.599
S2-O23	0.833	0.801	0.850	0.466	0.593	0.465
S2-F2	0.575	0.523	0.594	0.267	0.267	0.267
O23-H	0.529	0.528	0.529	0.526	0.531	0.527
			$SO_3CF_3^-$ (C_{3v})			
S−O	1.030	1.196	1.043	1.205	1.043	1.204
S−C	0.686	0.680	0.696	0.691	0.694	0.689
C−F	0.700	0.717	0.712	0.729	0.712	0.727

[a] Symbols of atoms are shown in Figure 1.

Table S4. Calculated volumes for the optimized $HOSO_2F$, SO_3F^-, $(FO_2SOH)OSO_2F^-$, $(FO_2SOH)_2O_2SOF^-$, and $SO_3CF_3^-$ [a]

	HF		B3LYP		PBE1PBE		MPW1PW91		MP2	
	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ
$HOSO_2F$ (C_1)	75	77	79	83	78	77	79	80	80	82
SO_3F^- (C_{3v})	80	78	81	85	79	84	80	85	83	88
$(FO_2SOH)OSO_2F^-$ (C_1)	153	154	160	161	156	156	151	156	153	162
$(FO_2SOH)OSO_2F^-$ (C_i)	149	146	160	158	155	159	153	157	160	160
$(FO_2SOH)_2O_2SOF^-$ (C_s)	223	230	231	231	234	230	232	232	-	-
$SO_3CF_3^-$ (C_{3v})	113	114	116	122	115	117	115	118	117	117

[a] Volumes are given in Å^3.

Table S5. Gibbs free energies of $HOSO_2F$ dissociation from $(FO_2SOH)OSO_2F^-$ and $(FO_2SOH)_2O_2SOF^-$ [a]

	HF		B3LYP		PBE1PBE		MPW1PW91		MP2	
	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ
$(FO_2SOH)OSO_2F^-$ (C_1)	82.6	78.3	107.7	92.5	109.6	100.9	106.7	98.8	110.4	100.4
$(FO_2SOH)OSO_2F^-$ (C_i)	87.1	80.0	106.2	92.1	99.9	101.3	97.1	100.0	109.4	100.7
$(FO_2SOH)_2O_2SOF^-$ (C_s) [b]	50.6	39.9	46.0	48.6	52.3	47.6	50.6	35.4	-	-
$(FO_2SOH)_2O_2SOF^-$ (C_s) [c]	46.1	38.2	47.5	48.9	61.9	47.1	60.3	34.1	-	-

[a] Energies are given in kJ mol^{-1}. [b] The dissociation energy is calculated when the $(FO_2SOH)_2O_2SOF^-$ (C_s) is divided to the $(FO_2SOH)OSO_2F^-$ (C_1) and the $HOSO_2F$ (C_1). [c] The dissociation energy is calculated when the $(FO_2SOH)_2O_2SOF^-$ (C_s) is divided to the $(FO_2SOH)OSO_2F^-$ (C_i) and the $HOSO_2F$ (C_1).

Table S6. Calculated frequencies and intensities for $HOSO_2F$, SO_3F^-, $(FO_2SOH)OSO_2F^-$, $(FO_2SOH)_2O_2SOF^-$, and $SO_3CF_3^-$ [a]

Mode*	Representation	HF		B3LYP		PBE1PBE		MPW1PW91		MP2	
		cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ	cc-pVTZ	aug-cc-pVTZ
						$HOSO_2F$ (C_1)					
1	A	318(2)[92]	315(1)[91]	280(3)[71]	276(2)[70]	287(3)[72]	282(2)[71]	284(2)[73]	285(2)[70]	290(3)[70]	287(2)[68]
2	A	421(1)[<1]	420(1)[<1]	359(2)[1]	356(1)[1]	368(1)[<1]	365(1)[<1]	368(1)[<1]	366(1)[<1]	372(2)[<1]	366(1)[<1]
3	A	460(1)[26]	457(1)[25]	403(1)[29]	399(1)[28]	413(1)[30]	409(1)[27]	412(1)[28]	409(1)[28]	417(1)[30]	411(1)[29]
4	A	577(2)[39]	574(1)[38]	496(3)[29]	492(2)[28]	507(2)[30]	503(2)[29]	507(2)[30]	504(2)[29]	509(3)[31]	502(2)[29]
5	A	612(2)[49]	610(1)[46]	515(3)[16]	512(2)[14]	531(3)[21]	528(2)[19]	531(3)[20]	528(2)[19]	532(3)[20]	524(2)[17]
6	A	623(2)[65]	621(2)[62]	530(4)[34]	526(3)[32]	544(3)[38]	541(2)[36]	544(3)[38]	541(2)[36]	545(4)[39]	537(3)[35]
7	A	960(8)[180]	956(10)[173]	788(12)[158]	776(15)[164]	828(11)[156]	818(14)[159]	825(11)[159]	816(14)[160]	821(12)[163]	805(16)[166]
8	A	1026(5)[284]	1022(6)[270]	859(6)[248]	849(9)[235]	903(6)[248]	895(8)[235]	900(6)[249]	891(8)[237]	898(7)[248]	885(10)[232]
9	A	1262(2)[101]	1259(2)[103]	1164(4)[79]	1161(4)[79]	1166(3)[78]	1162(3)[79]	1168(3)[78]	1165(3)[79]	1174(3)[76]	1166(3)[77]
10	A	1371(8)[237]	1363(12)[233]	1219(12)[166]	1208(19)[166]	1257(11)[178]	1247(18)[176]	1255(11)[178]	1246(18)[176]	1261(14)[170]	1242(23)[169]
11	A	1613(2)[388]	1601(2)[391]	1461(3)[263]	1447(4)[274]	1501(3)[274]	1488(3)[282]	1499(3)[276]	1487(3)[283]	1512(3)[254]	1488(4)[264]
12	A	4081(41)[222]	4072(45)[219]	3747(60)[139]	3738(66)[141]	3804(55)[150]	3795(60)[150]	3812(55)[148]	3799(60)[149]	3785(51)[157]	3756(59)[157]
						SO_3F^- (C_{3v})					
1,2	E	442(1)[<1]	439(1)[<1]	375(2)[<1]	369(2)[<1]	386(2)[<1]	380(1)[<1]	385(2)[<1]	380(1)[<1]	389(2)[<1]	378(2)[<1]
3	A_1	631(3)[11]	627(2)[11]	515(5)[1]	508(5)[3]	538(4)[<1]	533(3)[<1]	537(4)[<1]	532(3)[<1]	540(4)[<1]	527(4)[<1]
4,5	E	647(3)[54]	641(1)[49]	558(4)[33]	549(2)[30]	570(3)[34]	562(2)[31]	570(4)[34]	562(2)[31]	571(4)[35]	555(2)[31]
6	A_1	842(4)[334]	834(4)[318]	688(5)[267]	665(6)[269]	721(5)[270]	702(6)[270]	718(5)[273]	699(6)[271]	711(6)[272]	681(8)[268]
7	A_1	1189(14)[75]	1179(27)[73]	1043(21)[61]	1028(43)[60]	1081(20)[63]	1068(40)[62]	1078(20)[63]	1066(40)[62]	1084(23)[62]	1061(49)[59]
8,9	E	1428(2)[457]	1408(3)[472]	1284(3)[343]	1256(7)[374]	1326(3)[356]	1302(6)[383]	1323(3)[359]	1300(6)[383]	1335(3)[350]	1296(7)[380]

$(FO_2SOH)OSO_2F^-$ (C_1)

1	A	5(<1)[1]	5(<1)[1]	3(0)[1]	7(<1)[<1]	4(0)[1]	8(<1)[1]	4(0)[1]	7(0)[1]	5(0)[1]	9(<1)[1]
2	A	23(<1)[1]	23(<1)[1]	13(<1)[76]	22(<1)[1]	22(0)[1]	21(<1)[2]	22(0)[1]	21(0)[5]	20(0)[7]	19(<1)[11]
3	A	48(<1)[1]	48(<1)[1]	48(<1)[<1]	49(<1)[<1]	49(<1)[<1]	48(<1)[<1]	49(<1)[0]	49(<1)[<1]	50(<1)[<1]	47(<1)[<1]
4	A	57(<1)[2]	55(<1)[2]	44(<1)[197]	54(<1)[24]	58(0)[13]	56(<1)[30]	58(0)[20]	53(0)[52]	58(<1)[40]	55(<1)[53]
5	A	86(<1)[5]	85(<1)[5]	95(<1)[2]	92(<1)[10]	94(<1)[0]	94(<1)[<1]	95(<1)[<1]	95(<1)[<1]	95(<1)[<1]	92(<1)[9]
6	A	214(<1)[84]	211(<1)[77]	190(<1)[3744]	217(<1)[809]	291(5)[<1]	289(4)[12]	291(5)[<1]	278(0)[3228]	256(<1)[3473]	211(<1)[2043]
7	A	431(1)[1]	429(<1)[1]	287(5)[112]	353(4)[531]	343(0)[1856]	306(<1)[2730]	326(0)[2392]	289(4)[<1]	295(5)[<1]	321(6)[806]
8	A	440(1)[<1]	438(1)[<1]	371(<1)[1]	366(<1)[1]	381(0)[1]	377(<1)[1]	381(0)[1]	377(0)[1]	384(<1)[1]	376(<1)[1]
9	A	442(1)[4]	441(1)[3]	376(3)[<1]	371(2)[1]	385(3)[<1]	381(2)[<1]	385(3)[0]	382(2)[0]	389(3)[<1]	380(2)[<1]
10	A	463(2)[45]	461(2)[41]	393(<1)[284]	391(2)[293]	421(0)[1128]	408(<1)[709]	416(0)[896]	405(0)[533]	409(<1)[402]	399(<1)[290]
11	A	612(2)[51]	610(1)[39]	434(5)[14]	461(8)[550]	446(5)[<1]	441(4)[<1]	445(5)[<1]	441(4)[0]	451(5)[<1]	450(5)[181]
12	A	619(2)[115]	617(1)[114]	525(<1)[10]	520(3)[5]	543(5)[<1]	538(4)[<1]	543(6)[<1]	538(4)[<1]	545(<1)[16]	534(1)[9]
13	A	623(2)[127]	619(1)[122]	525(6)[<1]	521(3)[3]	543(<1)[17]	539(<1)[15]	543(<1)[17]	539(<1)[14]	545(6)[<1]	535(3)[3]
14	A	632(2)[22]	629(1)[20]	540(<1)[78]	533(<1)[74]	552(0)[82]	547(<1)[78]	552(0)[82]	547(0)[77]	553(<1)[82]	542(<1)[74]
15	A	651(4)[18]	646(2)[16]	562(6)[<1]	556(4)[1]	574(6)[<1]	569(4)[<1]	575(6)[0]	570(4)[0]	574(7)[<1]	563(4)[<1]
16	A	677(4)[45]	673(3)[40]	641(<1)[1098]	614(4)[367]	694(7)[<1]	678(<1)[1501]	689(<1)[1586]	671(0)[1447]	680(<1)[1396]	643(3)[642]
17	A	883(3)[276]	875(4)[263]	677(9)[106]	706(8)[473]	696(<1)[1638]	688(8)[20]	692(8)[<1]	686(9)[<1]	700(10)[<1]	713(11)[463]
18	A	925(7)[181]	921(8)[171]	745(9)[4]	722(14)[42]	782(9)[<1]	768(11)[<1]	779(9)[<1]	766(11)[<1]	773(10)[<1]	748(14)[32]
19	A	1051(<1)[163]	1039(<1)[151]	802(<1)[1522]	881(16)[2323]	858(0)[2073]	841(<1)[2000]	851(0)[1976]	834(0)[1886]	843(<1)[1893]	857(6)[2372]
20	A	1181(29)[207]	1176(39)[193]	1043(21)[193]	1013(43)[151]	1084(32)[<1]	1077(31)[213]	1083(32)[<1]	1076(49)[<1]	1084(34)[<1]	1054(36)[160]
21	A	1117(3)[312]	1110(4)[290]	1053(13)[330]	1083(9)[932]	1093(<1)[662]	1077(18)[354]	1089(<1)[628]	1074(0)[530]	1094(<1)[608]	1089(18)[508]
22	A	1340(5)[1182]	1330(5)[1184]	1127(<1)[87]	1111(<1)[90]	1144(0)[104]	1144(<1)[81]	1149(0)[95]	1148(0)[77]	1169(0)[88]	1154(<1)[80]

23	A	1384(5)[35]	1373(10)[28]	1238(11)[<1]	1221(21)[6]	1278(10)[<1]	1264(19)[<1]	1276(10)[<1]	1263(19)[<1]	1282(13)[<1]	1258(24)[3]
24	A	1461(<1)[268]	1448(1)[324]	1329(<1)[218]	1332(5)[347]	1385(0)[202]	1364(<1)[207]	1378(0)[234]	1358(0)[209]	1390(<1)[153]	1373(3)[90]
25	A	1488(4)[175]	1472(4)[134]	1360(<1)[651]	1354(9)[159]	1398(0)[719]	1381(<1)[686]	1396(0)[662]	1380(0)[663]	1412(<1)[908]	1386(2)[658]
26	A	1566(1)[393]	1553(1)[393]	1368(9)[15]	1377(5)[634]	1409(8)[<1]	1391(12)[<1]	1406(8)[<1]	1389(12)[<1]	1419(9)[<1]	1393(10)[419]
27	A	2686(118)[3444]	2740(120)[3370]	1510(<1)[388]	1530(6)[1112]	1527(0)[581]	1517(<1)[554]	1527(0)[554]	1517(0)[521]	1543(0)[369]	1526(1)[478]

$(FO_2SOH)OSO_2F^-$ (C_i)

1	A_u	−938(0)[7685]	−978(0)[7754]	189(0)[3916]	−148(0)[4282]	346(0)[1736]	306(0)[2721]	329(0)[2336]	276(0)[3259]	254(0)[3500]	139(0)[3442]
2	A_u	3(0)[1]	7(0)[1]	7(0)[<1]	11(0)[<1]	−7(0)[1]	7(0)[1]	−5(0)[1]	4(0)[1]	7(0)[<1]	8(0)[1]
3	A_u	26(0)[3]	27(0)[3]	11(0)[96]	28(0)[20]	21(0)[1]	21(0)[2]	21(0)[1]	20(0)[6]	21(0)[8]	−33(0)[622]
4	A_g	54(<1)[0]	52(<1)[0]	49(<1)[0]	49(<1)[0]	48(<1)[0]	48(<1)[0]	49(<1)[0]	49(<1)[0]	50(<1)[0]	47(<1)[0]
5	A_u	67(0)[3]	68(0)[3]	44(0)[200]	87(0)[600]	57(0)[13]	55(0)[30]	57(0)[19]	53(0)[53]	58(0)[40]	39(0)[231]
6	A_g	101(<1)[0]	101(<1)[0]	95(<1)[0]	95(<1)[0]	94(<1)[0]	94(<1)[0]	95(<1)[0]	95(<1)[0]	95(<1)[0]	92(<1)[0]
7	A_g	317(3)[0]	315(3)[0]	285(5)[0]	282(5)[0]	291(5)[0]	289(4)[0]	291(5)[0]	288(4)[0]	295(5)[0]	290(4)[0]
8	A_u	436(0)[1]	434(0)[1]	371(0)[1]	367(0)[1]	381(0)[1]	377(0)[1]	381(0)[1]	377(0)[1]	384(0)[1]	376(0)[1]
9	A_g	441(2)[0]	438(1)[0]	376(3)[0]	371(2)[0]	385(3)[0]	381(2)[0]	385(3)[0]	382(2)[0]	389(3)[0]	381(2)[0]
10	A_u	448(0)[25]	446(0)[23]	393(0)[282]	386(0)[173]	423(0)[1183]	408(0)[718]	416(0)[922]	405(0)[522]	409(0)[393]	397(0)[233]
11	A_g	502(3)[0]	499(2)[0]	433(5)[0]	428(4)[0]	446(5)[0]	441(4)[0]	445(5)[0]	441(4)[0]	451(5)[0]	442(4)[0]
12	A_g	627(4)[0]	624(3)[0]	525(6)[0]	520(5)[0]	543(5)[0]	539(4)[0]	542(6)[0]	538(4)[0]	545(6)[0]	535(5)[0]
13	A_u	628(0)[71]	625(0)[62]	525(0)[10]	520(0)[7]	543(0)[17]	539(0)[15]	543(0)[17]	539(0)[14]	545(0)[16]	535(0)[12]
14	A_u	626(0)[113]	623(0)[113]	540(0)[78]	534(0)[75]	552(0)[82]	547(0)[77]	552(0)[82]	547(0)[77]	553(0)[82]	542(0)[75]
15	A_g	653(4)[0]	649(3)[0]	562(6)[0]	556(4)[0]	574(6)[0]	569(4)[0]	575(6)[0]	570(4)[0]	574(7)[0]	563(4)[0]
16	A_u	682(0)[230]	677(0)[212]	643(0)[1214]	626(0)[1014]	698(0)[1636]	679(0)[1523]	690(0)[1598]	671(0)[1451]	680(0)[1404]	655(0)[1228]

17	A_g	763(5)[0]	758(5)[0]	675(9)[0]	668(11)[0]	694(7)[0]	687(8)[0]	693(8)[0]	686(9)[0]	700(10)[0]	689(12)[0]
18	A_g	907(7)[0]	902(9)[0]	745(9)[0]	729(10)[0]	782(9)[0]	768(11)[0]	779(9)[0]	766(11)[0]	773(10)[0]	751(12)[0]
19	A_u	925(0)[581]	918(0)[549]	799(0)[1485]	781(0)[1409]	859(0)[2124]	841(0)[2007]	851(0)[1990]	834(0)[1868]	843(0)[1876]	818(0)[1807]
20	A_u	1169(0)[182]	1161(0)[169]	1048(0)[504]	1031(0)[417]	1094(0)[668]	1077(0)[572]	1089(0)[624]	1074(0)[526]	1093(0)[593]	1067(0)[459]
21	A_g	1204(22)[0]	1199(32)[0]	1047(35)[0]	1039(54)[0]	1085(32)[0]	1077(49)[0]	1083(32)[0]	1076(49)[0]	1084(34)[0]	1069(56)[0]
22	A_u	1258(0)[123]	1254(0)[110]	1128(0)[89]	1131(0)[73]	1143(0)[107]	1144(0)[80]	1148(0)[98]	1148(0)[78]	1169(0)[90]	1161(0)[72]
23	A_g	1390(6)[0]	1379(11)[0]	1238(11)[0]	1222(21)[0]	1279(10)[0]	1265(19)[0]	1276(10)[0]	1263(19)[0]	1282(12)[0]	1259(24)[0]
24	A_u	1421(0)[204]	1408(0)[205]	1328(0)[217]	1305(0)[176]	1387(0)[199]	1364(0)[218]	1379(0)[236]	1357(0)[208]	1390(0)[149]	1355(0)[170]
25	A_u	1501(0)[627]	1486(0)[667]	1360(0)[665]	1341(0)[685]	1398(0)[720]	1381(0)[677]	1396(0)[659]	1380(0)[665]	1412(0)[913]	1383(0)[838]
26	A_g	1512(5)[0]	1496(6)[0]	1367(9)[0]	1347(14)[0]	1409(8)[0]	1391(12)[0]	1407(8)[0]	1389(12)[0]	1419(9)[0]	1390(13)[0]
27	A_u	1624(0)[442]	1617(0)[409]	1510(0)[382]	1500(0)[373]	1527(0)[599]	1517(0)[556]	1527(0)[562]	1517(0)[515]	1543(0)[367]	1523(0)[332]

$(FO_2SOH)_2O_2SOF^-$ (C_s)

1	A"	4(<1)[<1]	−1(<1)[<1]	1(<1)[<1]	1(<1)[<1]	2(<1)[<1]	4(<1)[<1]	1(<1)[<1]	−4(<1)[<1]	-	-
2	A'	6(<1)[<1]	6(<1)[<1]	5(<1)[<1]	7(<1)[<1]	5(<1)[<1]	6(<1)[1]	5(<1)[<1]	5(<1)[1]	-	-
3	A'	9(<1)[<1]	8(<1)[<1]	9(<1)[<1]	9(<1)[<1]	9(<1)[<1]	10(<1)[<1]	9(<1)[<1]	9(<1)[<1]	-	-
4	A'	23(<1)[<1]	22(<1)[<1]	22(<1)[<1]	23(<1)[<1]	23(<1)[<1]	24(<1)[<1]	23(<1)[<1]	23(<1)[<1]	-	-
5	A"	26(<1)[<1]	25(<1)[<1]	24(<1)[<1]	24(<1)[<1]	24(<1)[<1]	23(<1)[<1]	24(<1)[<1]	23(<1)[<1]	-	-
6	A"	38(<1)[<1]	40(<1)[<1]	39(<1)[<1]	46(<1)[<1]	39(<1)[<1]	45(<1)[<1]	39(<1)[0]	45(<1)[<1]	-	-
7	A'	52(<1)[2]	51(<1)[2]	50(<1)[<1]	47(<1)[<1]	52(<1)[<1]	47(<1)[<1]	52(<1)[<1]	48(<1)[<1]	-	-
8	A"	64(<1)[8]	62(<1)[7]	70(<1)[7]	61(<1)[5]	73(<1)[9]	64(<1)[5]	73(<1)[9]	64(<1)[5]	-	-
9	A'	60(<1)[1]	60(<1)[1]	62(<1)[<1]	65(<1)[1]	62(<1)[<1]	65(<1)[<1]	62(<1)[<1]	65(<1)[<1]	-	-
10	A"	92(<1)[1]	88(<1)[2]	90(<1)[3]	88(<1)[7]	92(<1)[2]	90(<1)[6]	92(<1)[2]	91(<1)[6]	-	-

11	A'	169(<1)[5]	168(<1)[5]	172(<1)[2]	166(<1)[2]	180(<1)[2]	174(<1)[2]	178(<1)[2]	173(<1)[2]	-	-
12	A"	217(<1)[113]	217(<1)[106]	243(<1)[206]	245(<1)[206]	251(<1)[233]	253(<1)[233]	251(<1)[232]	252(<1)[231]	-	-
13	A"	429(2)[<1]	427(1)[<1]	369(3)[1]	364(2)[<1]	378(2)[1]	374(2)[<1]	379(3)[1]	375(2)[<1]	-	-
14	A'	429(<1)[3]	427(<1)[3]	369(<1)[1]	364(<1)[1]	379(<1)[1]	375(<1)[1]	379(<1)[1]	375(<1)[1]	-	-
15	A"	440(<1)[1]	439(<1)[1]	377(<1)[1]	373(1)[<1]	386(<1)[3]	383(1)[1]	386(<1)[2]	383(1)[1]	-	-
16	A'	442(2)[1]	440(1)[1]	380(3)[2]	376(1)[2]	390(3)[1]	386(1)[1]	390(3)[1]	386(1)[1]	-	-
17	A'	453(1)[5]	452(1)[4]	396(2)[4]	394(3)[4]	407(2)[4]	405(2)[5]	407(2)[4]	405(2)[4]	-	-
18	A"	466(<1)[62]	464(<1)[58]	406(1)[159]	400(1)[140]	417(1)[206]	412(1)[186]	416(1)[193]	411(1)[175]	-	-
19	A"	611(2)[18]	609(1)[25]	522(<1)[32]	517(<1)[22]	537(1)[229]	533(1)[191]	537(<1)[158]	534(1)[130]	-	-
20	A'	607(3)[30]	605(2)[29]	522(6)[22]	518(4)[19]	538(6)[33]	535(4)[28]	538(5)[30]	535(4)[26]	-	-
21	A'	619(3)[66]	616(2)[56]	527(6)[24]	523(4)[19]	539(7)[33]	536(5)[42]	540(7)[37]	537(5)[43]	-	-
22	A"	619(<1)[9]	617(1)[13]	529(2)[281]	524(2)[267]	539(1)[111]	536(<1)[142]	540(1)[179]	537(1)[197]	-	-
23	A'	626(2)[33]	623(1)[48]	530(3)[18]	525(3)[27]	545(2)[7]	541(2)[14]	545(2)[8]	541(2)[14]	-	-
24	A"	621(2)[262]	618(1)[232]	537(2)[<1]	533(1)[6]	551(2)[4]	546(1)[<1]	551(2)[3]	547(1)[<1]	-	-
25	A'	634(2)[39]	631(2)[30]	538(3)[16]	533(2)[21]	552(2)[15]	547(1)[11]	552(2)[15]	548(2)[12]	-	-
26	A"	649(3)[8]	646(2)[8]	560(6)[8]	558(4)[14]	571(5)[6]	571(4)[12]	572(5)[6]	571(4)[11]	-	-
27	A'	681(4)[15]	679(3)[14]	618(8)[7]	616(7)[11]	634(7)[8]	634(6)[10]	634(7)[7]	633(6)[9]	-	-
28	A'	912(<1)[129]	902(1)[104]	759(3)[446]	739(4)[242]	797(13)[431]	784(1)[353]	795(12)[451]	781(1)[319]	-	-
29	A"	921(<1)[17]	914(<1)[16]	758(<1)[23]	744(<1)[6]	795(<1)[40]	784(<1)[12]	792(<1)[35]	782(<1)[11]	-	-
30	A'	928(13)[122]	922(14)[85]	762(24)[100]	747(29)[309]	803(11)[103]	788(30)[185]	799(13)[92]	786(29)[222]	-	-
31	A"	952(<1)[17]	944(<1)[28]	947(<1)[281]	933(<1)[136]	989(<1)[259]	968(<1)[80]	986(<1)[267]	968(<1)[90]	-	-
32	A'	958(3)[577]	949(5)[585]	946(7)[76]	936(6)[66]	988(5)[60]	971(1)[72]	986(5)[66]	971(2)[69]	-	-
33	A"	1097(<1)[258]	1091(1)[216]	961(<1)[74]	947(1)[159]	1003(<1)[130]	990(1)[244]	1001(<1)[112]	988(1)[227]	-	-

34	A'	1098(10)[267]	1093(13)[283]	968(6)[258]	951(13)[311]	1010(7)[251]	994(15)[295]	1007(6)[257]	991(14)[302]	-	-
35	A'	1199(36)[88]	1195(46)[84]	1046(70)[69]	1039(88)[59]	1082(65)[73]	1075(82)[60]	1081(65)[72]	1074(82)[60]	-	-
36	A"	1329(3)[1795]	1321(3)[1797]	1162(3)[2038]	1151(3)[2095]	1193(2)[2204]	1184(3)[2293]	1192(2)[2200]	1183(3)[2266]	-	-
37	A'	1362(12)[175]	1353(21)[159]	1215(22)[170]	1203(39)[160]	1254(21)[187]	1242(36)[156]	1252(21)[186]	1241(36)[161]	-	-
38	A"	1389(2)[49]	1381(3)[50]	1233(4)[7]	1222(6)[9]	1272(3)[4]	1262(5)[4]	1271(4)[5]	1261(6)[6]	-	-
39	A'	1418(2)[33]	1414(2)[39]	1317(10)[227]	1301(12)[230]	1356(3)[122]	1344(8)[219]	1355(4)[155]	1343(9)[226]	-	-
40	A'	1458(6)[413]	1444(6)[403]	1345(9)[50]	1340(11)[71]	1367(12)[140]	1364(9)[51]	1365(12)[114]	1363(9)[50]	-	-
41	A"	1421(<1)[2]	1418(<1)[2]	1346(1)[106]	1343(2)[127]	1363(<1)[69]	1367(1)[84]	1363(<1)[70]	1366(1)[84]	-	-
42	A"	1573(1)[143]	1561(2)[141]	1429(1)[44]	1417(1)[33]	1463(1)[75]	1451(2)[58]	1461(1)[73]	1449(2)[60]	-	-
43	A'	1575(2)[633]	1562(2)[640]	1430(2)[398]	1417(2)[393]	1464(2)[423]	1451(2)[435]	1462(2)[426]	1450(2)[434]	-	-
44	A"	3173(17)[5322]	3191(22)[5193]	2490(9)[7464]	2508(15)[7432]	2426(9)[7614]	2441(14)[7606]	2447(8)[7611]	2461(13)[7601]	-	-
45	A'	3228(290)[236]	3243(290)[274]	2589(486)[140]	2602(515)[159]	2534(413)[174]	2545(440)[193]	2553(424)[157]	2563(451)[173]	-	-

$SO_3CF_3^-$ (C_{3v})

1	A_2	77(0)[0]	76(0)[0]	58(0)[0]	61(0)[0]	60(0)[0]	62(0)[0]	61(0)[0]	62(0)[0]	68(0)[0]	66(0)[0]
2,3	E	221(<1)[2]	220(<1)[2]	189(<1)[1]	189(<1)[1]	191(<1)[1]	191(<1)[1]	192(<1)[1]	191(<1)[1]	197(<1)[1]	194(<1)[1]
4	A_1	338(3)[<1]	336(4)[<1]	279(5)[<1]	276(6)[<1]	294(4)[<1]	292(5)[<1]	293(4)[<1]	290(5)[<1]	303(4)[<1]	299(5)[<1]
5,6	E	385(2)[<1]	383(1)[<1]	332(3)[<1]	329(2)[<1]	340(3)[<1]	337(2)[<1]	340(3)[<1]	337(2)[<1]	343(3)[<1]	339(2)[<1]
7,8	E	575(<1)[22]	572(<1)[21]	506(1)[13]	501(<1)[13]	515(1)[15]	510(<1)[14]	515(1)[15]	511(<1)[14]	517(1)[15]	506(<1)[14]
9,10	E	639(3)[14]	635(2)[12]	559(4)[9]	555(2)[8]	571(4)[8]	568(2)[7]	572(4)[9]	568(2)[7]	574(4)[8]	565(2)[6]
11	A_1	722(<1)[242]	716(<1)[232]	626(1)[176]	616(1)[168]	640(1)[173]	632(<1)[164]	640(1)[175]	632(<1)[167]	640(1)[169]	625(1)[154]
12	A_1	838(5)[22]	836(7)[18]	735(6)[6]	732(10)[5]	758(6)[7]	756(9)[6]	757(6)[7]	755(9)[6]	755(6)[8]	749(10)[6]
13	A_1	1156(12)[186]	1146(23)[187]	1011(16)[168]	997(36)[173]	1047(15)[166]	1035(33)[170]	1045(15)[168]	1034(33)[171]	1055(18)[150]	1033(41)[153]

14,15	E	1312(2)[167]	1307(2)[141]	1124(1)[180]	1111(3)[167]	1171(1)[173]	1162(3)[158]	1167(1)[176]	1158(2)[161]	1175(1)[168]	1157(3)[145]
16	A_1	1397(4)[80]	1386(6)[81]	1195(5)[76]	1180(8)[76]	1236(5)[76]	1223(7)[75]	1234(5)[76]	1221(7)[75]	1254(5)[75]	1235(7)[76]
17,18	E	1418(2)[494]	1402(3)[524]	1267(4)[347]	1243(7)[389]	1308(4)[365]	1287(6)[402]	1306(4)[367]	1286(6)[401]	1317(4)[355]	1283(7)[404]

[a] Frequencies are given in cm^{-1}. Values in parentheses are Raman intensities ($Å^4$ amu^{-1}), and values in square brackets are IR intensities (km mol^{-1}). * Modes correspond to the extracted Gaussian result files shown at the end of ESI .

Table S7. Vibrational frequencies and intensities for $(FO_2SOH)OSO_2F^-$ [a]

$EMIm(FO_2SOH)OSO_2F$ [b]			$Na(FO_2SOH)OSO_2F$ [d]		$Cs(FO_2SOH)OSO_2F$ [d]
Raman	IR	Assignment [c]	Raman	IR	Raman
					252
					276
398(42)		mode 10	408		409
	480(w)	mode 11			450
557(36)	559(m)	mode 15	562	570	567
576(29)	575(w)	mode 16	580	590	584
					591
788(37)	781(w)	modes 17 and 18		790	798
			835		
				900	
961(30)	959(m)	mode 19	970	790?	
1053(77)	1054(m)	mode 20			
1067(67)	1069(sh)	mode 21	1084	1100	1065
			1124		
1245(50)	1245(m)	modes 24, 25, and 26	1280	1320	1243
					1364
	1694(w)	mode 27			

[a] Frequencies are given in cm^{-1}. [b] The experimental Raman intensities are scaled relative to the maximum intensity mode, which is assigned a value of 100. The abbreviations, w and m, denote weak and medium. Vibrational modes assigned to the cation or combination modes and overtones are summarized in the following part in ESI. Liquid at 25°C. [c] See Table S6 for the corresponding vibrational modes. [d] [C. Josson, M. Deporcqstratmains and P. Vast, *Bull. Soc. Chim. Fr.*, 1977, 820-824.]

Table S8. Vibrational frequencies and intensities for $(FO_2SOH)_2O_2SOF^-$ [a]

EMIm$(FO_2SOH)_2O_2SOF$ [b]		
Raman	IR	Assignment [c]
400(60)		modes 16 and 17
552(61)	545(sh) 557(s)	modes 19, 20, 21, 22, 23, 24, 25, and 26
806(62)	799(s)	mode 30
961(50)	959(s)	mode 34
1069(100)	1068(w)	mode 35
	1194(w)	mode 36
1230(59)	1226(w)	mode 37
	1436(m)	mode 43

[a] Frequencies are given in cm^{-1}. [b] The experimental Raman intensities are scaled relative to the maximum intensity mode, which is assigned a value of 100. The abbreviations, sh, w, m, and s, denote shoulder, weak, medium, and strong. Vibrational modes assigned to the cation or combination modes and overtones are summarized in the following part in ESI. Liquid at 25°C. [c] See Table S6 for the corresponding vibrational modes.

Table S9. Vibrational frequencies, intensities, and assignments for $HOSO_2F$ [a]

$HOSO_2F$ [b]		$HOSO_2F$ [c]			
Raman	IR	Raman	IR	Calcd. [d]	Assignment [e] (C_1)
				276(2)[70]	δ(OH)[f]
390(47)		386		356(1)[1]	δ(S(F)O) + $\delta(SO_2)$
401(50)		401		399(1)[28]	ρ(OH)[f] + smallδ(S(F)O) + small$\delta(SO_2)$
551(70)	544(s)	547	547	492(2)[28]	ρ_w(S(F)O)
557(65)	553(sh)	561	560	512(2)[14]	$\delta_s(SO_3)$
				526(3)[32]	$\delta_s(S(F)O_2)$
	634(w)		644	Combination	
849(100)	834(s)	848	835	776(15)[164]	$\delta_s(SO_3) - \nu$(SF)
959(40)	957 (s)	961	965	849(9)[235]	ν_a(S(F)O) + $\rho_w(SO_2)$
1205 (55)	1209(sh)	1193	1208	1161(4)[79]	δ(OH)[g]
1233(48)	1237(s)	1238	1228	1208(19)[166]	$\nu_s(SO_2)$
1441(21)	1437 (s)	1435	1438	1447(4)[274]	$\nu_a(SO_2)$ + δ(OH)[g]
	2398(w)		2407	combination	
3043(4)	3102(br)	3040	3060	3738(66)[141]	ν(OH)

[a] Frequencies are given in cm^{-1}. The experimental Raman intensities are scaled relative to the intensity of the $\delta_s(SO_3) - \nu$(SF) mode of $HOSO_2F$, which is assigned a value of 100. The abbreviations, sh, br, w, and s, denote shoulder, broad, weak, and strong. [b] Liquid at 25°C in this study. [c] Liquid at −53°C. [A. Goypiron, J. Devillepin and A. Novak, *J. Chim. Phys. Phys.-Chim. Biol.,* 1979, **76**, 267-272.] [d] B3LYP/aug-cc-pVTZ. Values in parentheses are Raman intensities ($Å^4$ amu^{-1}) and values in square brackets are infrared intensities (km mol^{-1}). [e] ν: stretching. δ: bending or deformation. ρ_w: wagging. ρ_t: twisting. Subscripts, *a* and *s*, denote asymmetric and symmetric modes, respectively. [f] δ(OH) parallel to the S-F bond. [g] δ(OH) perpendicular to the S-F bond.

Vibrational frequencies and intensities for the $EMIm^+$ cation, combination modes, and overtones in the present $(FO_2SOH)_nO_nSO_{3-n}F^-$ (n = 0, 1, and 2) salts

The following is the vibrational frequencies and intensities for the cationic species, combination modes, and overtones in the present $(FO_2SOH)_nO_nSO_{3-n}F^-$ (n = 0, 1, and 2) salts. See the following references for the assignment of the $EMIm^+$ cation [(a) Y. Umebayashi, T. Mitsugi, S. Fukuda, T. Fujimori, K. Fujii, R. Kanzaki, M. Takeuchi and S. Ishiguro, *J. Phys. Chem. B*, 2007, **111**, 13028-13032. (b) K. Matsumoto, R. Hagiwara, R. Yoshida, Y. Ito, Z. Mazej, P. Benkič, B. Žemva, O. Tamada,

H. Yoshino and S. Matsubara, *Dalton Trans.*, 2004, 144-149. (c) S. A. Katsyuba, P. J. Dyson, E. E. Vandyukova, A. V. Chernova, and A. Vidiš, *Helv. Chim. Acta*, 2004, **87**, 2556-2565. (d) N. E. Heimer, R. E. Del Sesto, Z. Z. Meng, J. S. Wilkes and W. R. Carper, *J. Mol. Liq.*, 2006, **124**, 84-95. (e) Y. Umebayashi, T. Fujimori, T. Sukizaki, M. Asada, K. Fujii, R. Kanzaki and S. Ishiguro, *J. Phys. Chem. A*, 2005, **109**, 8976-8982. (f) E. R. Talaty, S. Raja, V. J. Storhaug, A. Do1lle and W. R. Carper, *J. Phys. Chem. B*, 2004, **108**, 13177-13184.].

EMImCl

Raman (neat super cooled liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 123(18), 160(22), 247(18), 294(7), 390(9), 437(13), 597(39), 630(4), 651(6), 700(28), 808(5), 903(8), 959(20), 1024(79), 1035(21), 1090(26), 1106(16), 1115(16), 1125(28), 1170(5), 1259(10), 1303(13), 1309(13), 1335(67), 1382(32), 1417(62), 1440(34), 1446(40), 1460(33), 1483(24), 1564(13), 2841(32), 2886(36), 2944(97), 2982(100), 2998(87), 3054(43), 3128(12), 3145(12) (EMIm^{+}).

IR (neat super cooled liquid at 25 ^{o}C, frequency/cm^{-1}(intensity)): 425(w), 597(m), 621(s), 648(s), 701(m), 755(s), 805(w), 839(s), 959(m), 1027(m), 1088(m), 1120(w), 1166(s), 1250(w), 1295(w), 1334(m), 1355(w), 1383(m), 1429(w), 1448(w), 1461(m), 1567(s), 2821(w), 2873(w), 2939(sh), 2977(w), 3089(s), 3142(w) (EMIm^{+}). 2461(w), 2578(w), 2674(w), 2737(w) (combination bands and overtones).

EMImSO$_3$F

Raman (neat liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 121(7), 161(8), 240(7), 437(5), 599(17), 703(9), 960(8), 1024(20), 1089(12), 1120(6), 1170(2), 1251(4), 1336(15), 1388(12), 1422(27), 1454(16), 1569(7), 2831(4), 2887(10), 2926(14), 2949(26), 2968(33), 2995(19), 3115(6), 3165(5) (EMIm^{+}).

IR (neat liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 431(w), 623(m), 648(m), 760(w), 803(w), 848(m), 959(w), 1023(sh), 1034(w), 1089(w), 1112(w), 1171(s), 1301(sh), 1334(w), 1356(w), 1390(w), 1429(w), 1452(w), 1466(w), 1573(s), 2829(w), 2884(w), 2947(w), 2966(w), 2987(w), 3091(sh), 3118(m), 3160(w) (EMIm^{+}). 2467(w), 2574(w), 2680(w), 2745(w) (combination bands and overtones).

EMIm(FO$_2$SOH)OSO$_2$F

Raman (neat liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 124(17), 159(21), 242(29), 433(28), 599(54), 622(19), 649(16), 703(24), 859(13), 1025(63), 1089(45), 1112(30), 1169(15), 1337(46), 1388(39), 1421(82), 1455(50), 1570(25), 2839(13), 2889(28), 2930(42), 2953(76), 2972(100), 3000(57), 3111(15), 3177(16) (EMIm^{+}).

IR (neat liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 426(w), 623(m), 649(w), 703(sh), 747(m), 847(w), 1135(sh), 1169(m), 1344(w), 1424(br), 1573(w), 2884(w), 2950(w), 2968(w), 2988(w), 3119(w), 3161(m) (EMIm^{+}). 2669(w) (combination bands and overtones).

EMIm(FO$_2$SOH)$_2$O$_2$SOF

Raman (neat liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 124(17), 158(24), 240(33), 296(23), 431(39), 597(64), 645(21), 702(28), 860(20), 1025(68), 1088(68), 1110(38), 1169(22), 1246(47), 1336(53), 1389(43), 1421(91), 1456(57), 1571(30), 2825(11), 2839(16), 2890(29), 2931(40), 2952(74), 2973(98), 2999(56), 3113(14), 3161(12), 3180(17) (EMIm^{+}).

IR (neat liquid at 25 ^{o}C, frequency/cm^{-1}(relative intensity)): 426(w), 623(w), 647(w), 701(w), 746(w), 840(w), 1134(w), 1168(m), 1245(w), 1333(w), 1573(m), 3118(w), 3163(m) (EMIm^{+}). 2211(br), 2292(w), 2392(w), 2675(w) (combination bands and overtones).

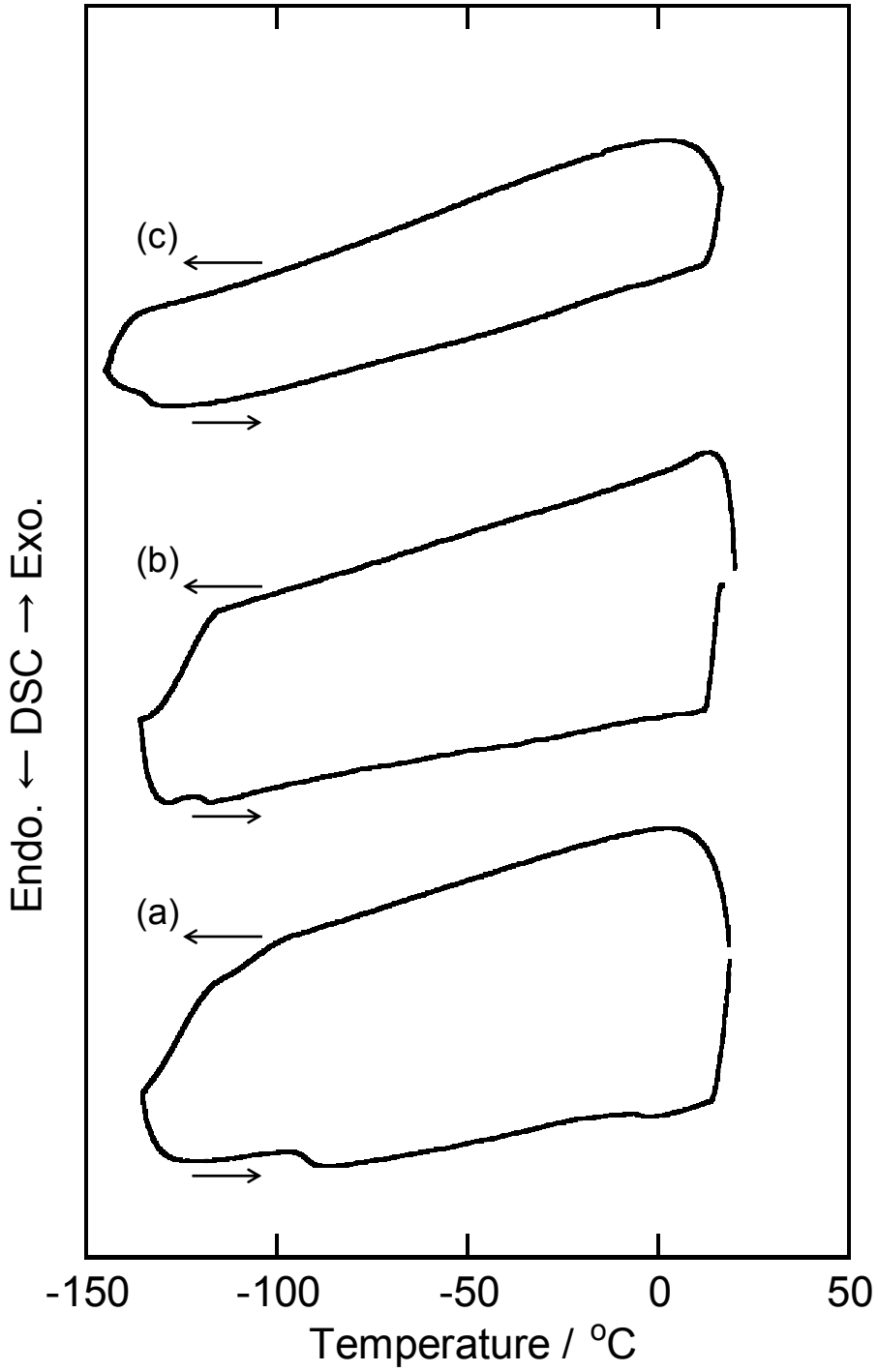

Figure S1. Differential scanning calorimetric curves of $EMIm(FO_2SOH)_nO_nSO_{3-n}F$ (n = 0, 1, and 2): (a) $EMImSO_3F$, (b) $EMIm(FO_2SOH)OSO_2F$, and (c) $EMIm(FO_2SOH)_2O_2SOF$. Scan rate of 5°C min^{-1} was used.

Table S10. Viscosities of $EMIm(FO_2SOH)_nO_nSO_{3-n}F$ (n = 0, 1, and 2)

T / °C	η / mPa s		
	$EMImSO_3F$	$EMIm(FO_2SOH)OSO_2F$	$EMIm(FO_2SOH)_2O_2SOF$
5	121.5	-	-
15	72.7	-	-
25	46.6	9.2	5.1
35	31.2	-	-
45	21.9	-	-
55	16.1	-	-
65	12.2	-	-

Table S11. Ionic conductivities of $EMIm(FO_2SOH)_nO_nSO_{3-n}F$ (n = 0, 1, and 2)

T / °C	σ / mS cm^{-1}		
	$EMImSO_3F$	$EMIm(FO_2SOH)OSO_2F$	$EMIm(FO_2SOH)_2O_2SOF$
5	4.8	19.5	29.5
15	7.4	24.7	35.7
25	10.8	30.7	43.2
35	15.0	37.5	50.8
45	19.9	44.6	59.1
55	25.7	52.2	67.7
65	32.3	60.1	76.8
75	39.3	68.1	86.4

Comparison between the fluorosulfate and fluorohydrogenate ILs. Fluorohydrogenate ILs contain fluorohydrogenate anions ($(FH)_nF^-$) and exhibit low viscosity and high ionic conductivity (*e.g.* 4.9 cP and 100 mS cm^{-1} at 25°C for $EMIm(FH)_{2.3}F$).[(a) R. Hagiwara, T. Hirashige, T. Tsuda and Y. Ito, *J. Fluorine Chem.*, 1999, **99**, 1-3. (b) R. Hagiwara, T. Hirashige, T. Tsuda and Y. Ito, *J. Electrochem. Soc.*, 2002, **149**, D1-D6. (c) R. Hagiwara, K. Matsumoto, Y. Nakamori, T. Tsuda, Y. Ito, H. Matsumoto and K. Momota, *J. Electrochem. Soc.*, 2003, **150**, D195-D199. (d) R. Hagiwara, Y. Nakamori, K. Matsumoto and Y. Ito, *J. Phys. Chem. B*, 2005, **109**, 5445-5449. (e) K. Matsumoto, R. Hagiwara and Y. Ito, *Electrochem. Solid State Lett.*, 2004, **7**, E41-E44. (f) K. Matsumoto and R. Hagiwara, *Electrochemistry*, 2005, **73**, 730-732. (g) M. Yamagata, S. Konno, K. Matsumoto and R. Hagiwara, *Electrochem. Solid State Lett.*, 2009, **12**, F9-F12. (h) S. Kanematsu, K. Matsumoto and R. Hagiwara, *Electrochem. Comm.* 2009, **11**, 1312-1315.] These prominent properties which make them attractive candidates as electrolytes [(a) R. Hagiwara and J. S. Lee, *Electrochemistry*, 2007, **75**, 23-34. (b) M. Ue, M. Takeda, A. Toriumi, A. Kominato, R. Hagiwara and Y. Ito, *J. Electrochem. Soc.*, 2003, **150**, A499-A502. (c) R. Hagiwara, T. Nohira, K. Matsumoto and Y. Tamba, *Electrochem. Solid State Lett.*, 2005, **8**, A231-A233. (d) A. Senda, K. Matsumoto, T. Nohira and R. Hagiwara, *J. Power Sources*, 2010, **195**, 4414-4417.] are considered to be derived from the weakened cation-anion interaction through HF exchange as recently proposed. [T. Enomoto, Y. Nakamori, K. Matsumoto and R. Hagiwara, *J. Phys. Chem. C*, 2011, **115**, 4324-4332.] It is noteworthy that the exchanging HF unit is bound to F^- (or $(FH)_{n-1}F^-$) even in the liquid state since fluorohydrogenate ILs do not show a HF dissociation pressure if the n is sufficiently low (e.g. $n < 2.3$ for $EMIm(FH)_nF$). In analogy with the $(FH)_nF^-$ ILs, the $HOSO_2F$ unit in the $(FO_2SOH)_nO_nSO_{3-n}F^-$ ILs is probably exchanged between the anionic species, and this exchanging unit working as a dielectric spacer contributes to their low viscosities. The calculated $HOSO_2F$ dissociation energy at B3LYP/aug-cc-pVTZ level is 92.5 and 48.6 kJ mol^{-1} for $(FO_2SOH)OSO_2F^-$ (C_1) and $(FO_2SOH)_2O_2SOF^-$ (C_s), respectively (see Table S5 in ESI for the results at the other levels), while the calculated HF dissociation energies at B3LYP/aug-cc-pVTZ level for FHF^-, $(FH)_2F^-$, and $(FH)_3F^-$ are 159.9, 85.6, and 50.0 kJ mol^{-1}, respectively. [T. Enomoto, Y. Nakamori, K. Matsumoto and R. Hagiwara, *J. Phys. Chem. C*, 2011, **115**, 4324-4332.]

*** Calculated frequencies and vibration modes of $HOSO_2F$, SO_3F^-, $(FO_2SOH)OSO_2F^-$, $(FO_2SOH)_2O_2SOF^-$, and $SO_3CF_3^-$ from Gaussian result file at B3LYP/aug-cc-pVTZ level.**

$HOSO_2F$ (C_1)

		1			2			3		
		A			A			A		
Frequencies --		276.4400			356.1118			399.0000		
Red. masses --		1.3979			15.1620			3.2350		
Frc consts --		0.0629			1.1329			0.3034		
IR Inten --		69.7001			0.5385			27.7870		
Raman Activ --		1.7188			1.2250			0.7679		
Depolar (P) --		0.7228			0.7380			0.7410		
Depolar (U) --		0.8391			0.8492			0.8512		
Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	0.01	-0.01	0.01	-0.06	0.00	-0.03	0.00	-0.01	0.01
2	9	-0.04	-0.07	0.01	0.47	-0.16	-0.12	0.04	0.16	-0.03
3	8	0.02	0.07	0.01	0.17	0.16	0.52	0.02	-0.15	0.11
4	8	-0.03	0.01	0.06	-0.35	0.17	-0.07	0.04	-0.01	-0.20
5	8	0.07	0.00	-0.05	-0.25	-0.15	-0.26	-0.10	0.00	0.16
6	1	-0.42	0.10	-0.89	-0.07	0.21	0.25	-0.20	-0.24	-0.87

		4			5			6		
		A			A			A		
Frequencies --		491.7156			511.8399			526.4593		
Red. masses --		7.6118			17.5785			15.4351		
Frc consts --		1.0843			2.7133			2.5205		
IR Inten --		27.8333			14.0845			32.2077		
Raman Activ --		1.9490			2.2718			2.8316		
Depolar (P) --		0.6525			0.6698			0.6701		
Depolar (U) --		0.7897			0.8023			0.8025		
Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	-0.03	-0.21	0.02	0.06	0.02	0.28	0.29	-0.06	-0.05
2	9	0.04	0.26	-0.04	0.10	0.05	0.51	-0.26	0.06	0.04
3	8	0.00	0.25	-0.02	-0.19	0.00	-0.27	0.41	-0.01	-0.24
4	8	-0.24	-0.11	-0.13	-0.01	0.17	-0.47	-0.38	0.32	0.10
5	8	0.28	-0.07	0.14	-0.02	-0.27	-0.42	-0.33	-0.27	0.19
6	1	-0.43	0.54	0.38	-0.12	-0.01	-0.15	0.37	0.06	-0.04

	7			8			9		
	A			A			A		
Frequencies --	776.4852			849.0604			1160.6027		
Red. masses --	19.9174			18.4769			1.2001		
Frc consts --	7.0754			7.8479			0.9525		
IR Inten --	164.0778			235.2499			78.5683		
Raman Activ --	14.7593			8.5917			3.5879		
Depolar (P) --	0.0151			0.1382			0.3963		
Depolar (U) --	0.0298			0.2429			0.5677		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.17	0.03	0.41	−0.34	0.06	0.34	0.01	−0.01	0.00
2 9	−0.15	−0.06	−0.68	0.00	−0.02	−0.19	0.00	0.00	0.00
3 8	−0.33	0.04	0.04	0.69	−0.10	−0.28	0.02	−0.08	−0.01
4 8	0.10	0.25	−0.05	−0.02	−0.16	−0.07	0.04	0.05	0.01
5 8	0.07	−0.28	0.00	0.00	0.15	−0.11	−0.03	0.03	−0.01
6 1	−0.05	−0.08	0.19	0.26	0.17	0.02	−0.85	0.41	0.32

	10			11			12		
	A			A			A		
Frequencies --	1208.4018			1446.7037			3737.6469		
Red. masses --	18.3451			12.1706			1.0657		
Frc consts --	15.7831			15.0079			8.7714		
IR Inten --	166.1797			273.5061			141.2386		
Raman Activ --	19.2271			3.7560			65.5242		
Depolar (P) --	0.0977			0.7329			0.2022		
Depolar (U) --	0.1781			0.8459			0.3364		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	−0.36	0.05	−0.16	0.06	0.42	−0.04	0.00	0.00	0.00
2 9	0.03	0.00	0.05	0.00	−0.02	0.00	0.00	0.00	0.00
3 8	0.10	0.00	−0.02	0.01	−0.07	0.00	0.03	0.05	−0.01
4 8	0.31	0.50	0.08	−0.21	−0.41	−0.05	0.00	0.00	0.00
5 8	0.27	−0.59	0.21	0.12	−0.36	0.11	0.00	0.00	0.00
6 1	0.07	−0.02	−0.09	−0.57	0.27	0.20	−0.43	−0.88	0.18

SO_3F^- (C_{3v})

	1			2			3		
	E			E			A1		
Frequencies --	368.6832			368.6836			507.8286		
Red. masses --	16.9789			16.9789			17.8255		
Frc consts --	1.3598			1.3598			2.7085		
IR Inten --	0.0557			0.0557			2.7000		
Raman Activ --	1.5000			1.5003			4.5951		
Depolar (P) --	0.7500			0.7500			0.3952		
Depolar (U) --	0.8571			0.8571			0.5665		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	−0.08	0.00	−0.08	0.00	0.00	0.00	0.00	0.11
2 9	0.00	0.54	0.00	0.54	0.00	0.00	0.00	0.00	0.74
3 8	0.00	0.04	−0.57	−0.37	0.00	0.00	0.00	0.12	−0.37
4 8	0.17	−0.27	0.29	−0.06	0.17	0.50	−0.10	−0.06	−0.37
5 8	−0.17	−0.27	0.29	−0.06	−0.17	−0.50	0.10	−0.06	−0.37

	4			5			6		
	E			E			A1		
Frequencies --	548.6575			548.6609			665.1953		
Red. masses --	17.9200			17.9200			23.6534		
Frc consts --	3.1783			3.1783			6.1666		
IR Inten --	29.7553			29.7643			269.4764		
Raman Activ --	1.8315			1.8317			5.7229		
Depolar (P) --	0.7500			0.7500			0.0622		
Depolar (U) --	0.8571			0.8571			0.1171		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.33	0.00	-0.33	0.00	0.00	0.00	0.00	0.65
2 9	0.00	-0.25	0.00	0.25	0.00	0.00	0.00	0.00	-0.53
3 8	0.00	0.37	0.17	0.62	0.00	0.00	0.00	0.22	-0.22
4 8	0.43	-0.37	-0.09	-0.13	-0.43	0.15	-0.19	-0.11	-0.22
5 8	-0.43	-0.37	-0.09	-0.13	0.43	-0.15	0.19	-0.11	-0.22

	7			8			9		
	A1			E			E		
Frequencies --	1028.0579			1256.3176			1256.3201		
Red. masses --	16.6532			20.7979			20.7979		
Frc consts --	10.3701			19.3406			19.3406		
IR Inten --	59.7401			373.9245			373.8885		
Raman Activ --	43.1185			7.2364			7.2394		
Depolar (P) --	0.0324			0.7500			0.7500		
Depolar (U) --	0.0628			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.20	0.55	0.00	0.00	0.00	0.55	0.00
2 9	0.00	0.00	0.00	-0.02	0.00	0.00	0.00	-0.02	0.00
3 8	0.00	-0.55	-0.14	-0.04	0.00	0.00	0.00	-0.67	-0.13
4 8	0.48	0.27	-0.14	-0.51	-0.27	0.11	-0.27	-0.20	0.06
5 8	-0.48	0.27	-0.14	-0.51	0.27	-0.11	0.27	-0.20	0.06

$(FO_2SOH)OSO_2F^-$ (C_1)

	1			2			3		
	A			A			A		
Frequencies --	7.3192			22.3747			48.5586		
Red. masses --	15.9333			15.5853			17.4775		
Frc consts --	0.0005			0.0046			0.0243		
IR Inten --	0.4680			0.8416			0.0358		
Raman Activ --	0.0003			0.0049			0.0466		
Depolar (P) --	0.7321			0.5685			0.7400		
Depolar (U) --	0.8453			0.7249			0.8506		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.02	0.02	-0.04	-0.04	-0.01	0.01	-0.02	0.10	0.06
2 16	-0.01	0.02	-0.03	-0.05	0.01	0.02	0.01	-0.09	-0.06
3 9	0.13	-0.10	0.38	0.41	0.11	-0.10	-0.40	0.04	0.01
4 9	0.13	-0.09	0.38	0.34	0.09	-0.11	0.47	-0.04	-0.05
5 8	-0.03	-0.08	-0.17	-0.15	0.30	0.21	0.05	-0.09	-0.07
6 8	-0.11	0.39	0.00	-0.18	-0.14	0.00	0.16	0.08	0.06
7 8	0.01	-0.23	-0.20	-0.03	-0.31	-0.13	-0.04	0.37	0.25
8 8	0.01	-0.24	-0.21	-0.05	-0.24	-0.08	0.02	-0.42	-0.25
9 8	-0.10	0.39	-0.01	-0.17	-0.13	0.01	-0.19	-0.11	-0.06
10 8	-0.02	-0.08	-0.15	-0.13	0.29	0.19	-0.06	0.16	0.10
11 1	0.00	-0.20	-0.19	-0.08	-0.29	-0.08	-0.01	-0.06	-0.01

	4			5			6		
	A			A			A		
Frequencies --	54.4645			91.9539			216.5821		
Red. masses --	12.0438			18.2675			7.3309		
Frc consts --	0.0210			0.0910			0.2026		
IR Inten --	24.2943			10.0295			808.6673		
Raman Activ --	0.0148			0.3242			0.2083		
Depolar (P) --	0.6949			0.2122			0.7411		
Depolar (U) --	0.8200			0.3501			0.8513		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.03	0.01	-0.01	0.25	-0.01	0.06	0.03	0.08	-0.09
2 16	-0.05	0.01	-0.02	-0.26	0.02	-0.06	-0.14	0.00	0.01
3 9	0.09	0.01	-0.02	0.24	-0.02	0.03	0.04	0.00	-0.06
4 9	0.03	0.01	-0.01	-0.26	0.00	-0.03	0.00	-0.06	0.04
5 8	-0.19	0.09	-0.24	0.20	-0.01	-0.03	0.37	-0.12	0.13
6 8	0.38	0.04	0.00	0.42	-0.02	0.06	-0.11	0.08	-0.06
7 8	-0.11	-0.17	0.30	0.20	-0.02	0.18	0.12	0.10	-0.11
8 8	-0.19	-0.15	0.26	-0.14	0.07	-0.27	-0.12	-0.14	0.18
9 8	0.27	0.04	-0.01	-0.54	0.02	-0.06	0.11	-0.06	0.04
10 8	-0.24	0.10	-0.24	-0.08	-0.05	0.14	-0.17	0.05	-0.03
11 1	-0.23	-0.25	0.39	-0.12	0.02	-0.06	-0.69	-0.24	0.30

	7			8			9		
	A			A			A		
Frequencies --	353.0588			366.4394			371.1650		
Red. masses --	7.9641			14.2825			16.8093		
Frc consts --	0.5849			1.1300			1.3644		
IR Inten --	531.4176			0.7298			1.0140		
Raman Activ --	4.2950			0.1228			2.1047		
Depolar (P) --	0.5326			0.7496			0.7476		
Depolar (U) --	0.6950			0.8569			0.8555		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.07	-0.03	0.02	-0.03	-0.01	-0.01	-0.05	-0.01	-0.03
2 16	0.03	-0.05	0.03	-0.04	-0.02	-0.02	0.02	0.01	0.02
3 9	0.03	0.03	0.03	0.25	0.02	0.05	0.42	0.01	0.16
4 9	-0.08	-0.08	0.26	0.41	0.01	0.07	-0.25	0.02	-0.12
5 8	-0.03	0.00	-0.06	-0.02	-0.15	-0.17	-0.07	-0.20	-0.30
6 8	-0.04	-0.03	0.00	-0.16	-0.09	-0.02	-0.26	-0.23	-0.05
7 8	0.03	0.09	-0.05	-0.06	0.22	0.14	-0.08	0.44	0.22
8 8	0.09	0.13	-0.18	-0.07	0.38	0.24	0.02	-0.30	-0.12
9 8	0.08	-0.28	0.00	-0.29	-0.11	-0.03	0.17	0.15	0.03
10 8	-0.31	0.27	-0.13	-0.04	-0.25	-0.26	0.07	0.11	0.19
11 1	0.58	0.28	-0.38	-0.05	0.33	0.23	-0.04	0.02	0.06

		10			11			12		
		A			A			A		
Frequencies --		391.4318			460.7123			520.0201		
Red. masses --		12.9971			10.0471			17.6939		
Frc consts --		1.1733			1.2565			2.8191		
IR Inten --		292.8508			549.5730			4.9676		
Raman Activ --		1.5539			7.8735			2.6943		
Depolar (P) --		0.7191			0.4771			0.5021		
Depolar (U) --		0.8366			0.6460			0.6686		
Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	-0.03	0.07	-0.12	-0.12	0.01	0.01	0.00	-0.01	-0.01
2	16	-0.07	0.03	-0.03	-0.04	0.13	-0.21	-0.04	0.20	0.13
3	9	-0.09	-0.20	0.43	0.06	-0.03	-0.07	0.01	-0.02	0.00
4	9	0.06	-0.04	0.05	0.00	-0.08	0.31	-0.06	0.58	0.11
5	8	-0.08	0.34	0.06	-0.04	-0.07	0.02	0.01	0.01	0.02
6	8	0.21	-0.40	-0.16	0.05	0.06	0.04	0.01	0.02	-0.01
7	8	0.09	0.19	-0.23	-0.04	-0.03	0.10	-0.01	0.02	0.00
8	8	-0.02	0.03	0.05	-0.10	0.07	-0.03	-0.02	-0.30	-0.23
9	8	0.05	-0.05	-0.02	0.12	-0.25	-0.23	0.05	-0.42	0.13
10	8	0.02	-0.02	0.02	0.30	0.09	0.20	0.09	-0.37	-0.29
11	1	-0.52	-0.09	0.05	-0.64	-0.19	0.25	0.00	-0.10	-0.11

		13			14			15		
		A			A			A		
Frequencies --		520.5176			533.4131			555.8720		
Red. masses --		17.6771			12.6561			18.2327		
Frc consts --		2.8218			2.1217			3.3193		
IR Inten --		2.6215			73.5573			1.2001		
Raman Activ --		2.6241			0.0913			3.8579		
Depolar (P) --		0.4521			0.6640			0.7443		
Depolar (U) --		0.6227			0.7981			0.8534		
Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	-0.04	0.19	0.10	0.15	0.06	-0.08	-0.28	-0.05	-0.04
2	16	0.00	0.01	-0.01	0.20	0.06	-0.07	0.21	0.02	0.02
3	9	-0.11	0.59	0.18	-0.13	-0.04	0.07	0.21	0.05	0.03
4	9	0.00	0.02	0.02	-0.18	0.00	0.08	-0.15	-0.03	-0.01
5	8	0.16	-0.33	-0.26	0.11	0.16	-0.08	0.02	-0.25	0.32
6	8	0.08	-0.42	0.06	-0.27	-0.09	-0.10	0.46	0.09	-0.05
7	8	-0.03	-0.33	-0.20	0.02	-0.14	0.23	-0.25	0.18	-0.23
8	8	-0.02	-0.01	0.00	0.05	-0.19	0.28	0.17	-0.14	0.19
9	8	0.01	-0.03	-0.02	-0.35	-0.10	-0.09	-0.33	-0.04	0.01
10	8	0.04	-0.01	0.01	0.11	0.18	-0.16	0.01	0.17	-0.22
11	1	-0.02	-0.12	-0.06	0.18	-0.25	0.47	0.02	-0.01	0.01

	16	17	18
	A	A	A
Frequencies --	614.1968	705.6826	721.9955
Red. masses --	12.5661	16.5758	21.9460
Frc consts --	2.7930	4.8634	6.7402
IR Inten --	367.0912	472.5843	41.8699
Raman Activ --	3.5440	7.8152	14.2730
Depolar (P) --	0.6225	0.0074	0.0470
Depolar (U) --	0.7673	0.0148	0.0897

Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	0.02	0.03	0.22	-0.11	0.21	0.01	-0.11	0.47	0.13
2	16	-0.01	0.08	-0.01	-0.01	0.32	0.18	0.07	-0.28	-0.06
3	9	0.00	-0.11	-0.19	0.03	-0.20	-0.06	0.11	-0.52	-0.17
4	9	-0.04	-0.05	-0.02	0.04	-0.46	-0.19	-0.04	0.33	0.10
5	8	-0.25	0.00	-0.27	0.09	-0.02	-0.04	0.20	-0.04	-0.09
6	8	-0.02	-0.01	0.31	-0.02	-0.07	0.00	0.04	-0.16	0.08
7	8	0.36	0.15	-0.35	-0.05	-0.16	0.18	-0.22	-0.14	-0.01
8	8	0.06	-0.15	0.20	0.12	0.08	-0.28	0.07	0.09	-0.03
9	8	-0.11	-0.04	0.01	-0.01	-0.09	0.26	0.00	0.08	-0.07
10	8	0.03	0.03	-0.08	0.04	0.01	-0.21	-0.10	0.02	0.07
11	1	-0.51	-0.19	0.08	-0.43	-0.19	-0.04	0.19	0.03	-0.10

	19	20	21
	A	A	A
Frequencies --	881.0957	1013.4266	1082.6828
Red. masses --	6.1972	10.3444	6.5646
Frc consts --	2.8346	6.2595	4.5338
IR Inten --	2322.7979	151.1917	932.4007
Raman Activ --	15.8288	43.3350	8.6061
Depolar (P) --	0.1898	0.0781	0.0449
Depolar (U) --	0.3190	0.1449	0.0859

Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	-0.14	0.00	-0.06	0.04	-0.01	0.02	-0.03	-0.13	-0.07
2	16	-0.04	-0.08	-0.03	-0.14	0.18	0.00	-0.03	-0.05	-0.04
3	9	-0.01	0.06	0.02	0.00	-0.02	0.00	-0.01	0.03	0.01
4	9	-0.02	0.10	0.01	0.02	-0.04	-0.01	-0.01	0.03	0.00
5	8	-0.08	-0.04	0.03	0.05	0.02	-0.01	0.22	0.20	-0.14
6	8	-0.01	0.01	-0.07	0.00	-0.01	0.02	-0.01	-0.02	0.34
7	8	0.31	-0.08	0.19	-0.20	-0.01	-0.01	-0.21	0.01	-0.03
8	8	0.32	0.05	-0.02	0.46	-0.10	0.17	0.13	0.03	-0.04
9	8	-0.01	0.02	0.03	0.04	0.00	-0.33	-0.01	0.00	0.12
10	8	-0.08	0.02	-0.02	-0.21	-0.18	0.16	0.05	0.06	-0.05
11	1	-0.80	-0.16	0.14	0.64	0.04	-0.16	-0.79	0.12	0.17

	22			23			24		
	A			A			A		
Frequencies --	1110.9417			1220.6248			1332.1389		
Red. masses --	1.0465			19.0299			13.2256		
Frc consts --	0.7610			16.7052			13.8282		
IR Inten --	90.1034			5.8888			346.6953		
Raman Activ --	0.0818			20.6206			5.1320		
Depolar (P) --	0.1716			0.1460			0.6880		
Depolar (U) --	0.2929			0.2547			0.8152		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	-0.01	0.00	-0.22	-0.04	-0.15	-0.19	-0.16	0.34
2 16	0.00	0.00	0.00	0.33	0.08	0.20	-0.02	-0.02	0.06
3 9	0.00	0.01	0.00	0.01	0.01	0.01	0.01	0.01	-0.01
4 9	0.00	0.01	0.00	-0.02	-0.01	-0.01	0.00	0.00	0.00
5 8	0.01	0.01	-0.01	0.17	0.13	-0.09	0.33	0.26	-0.22
6 8	0.00	0.00	0.01	0.03	-0.02	0.30	0.01	0.05	-0.44
7 8	-0.01	0.02	0.02	0.27	-0.01	0.07	0.04	0.00	0.00
8 8	0.00	0.03	0.02	-0.30	0.03	-0.10	-0.02	-0.02	0.02
9 8	0.00	0.00	0.00	-0.03	0.02	-0.46	0.00	0.00	-0.09
10 8	0.00	0.00	0.00	-0.34	-0.22	0.18	0.05	0.03	-0.04
11 1	0.00	-0.83	-0.56	-0.12	-0.06	0.15	-0.25	0.35	-0.44

	25			26			27		
	A			A			A		
Frequencies --	1354.4053			1377.2806			1529.9792		
Red. masses --	10.9527			1.7382			1.2580		
Frc consts --	11.8377			1.9427			1.7350		
IR Inten --	159.3643			633.5350			1111.6855		
Raman Activ --	8.6574			5.3156			5.7211		
Depolar (P) --	0.7155			0.3377			0.3836		
Depolar (U) --	0.8342			0.5049			0.5545		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.05	0.03	-0.06	0.08	0.00	0.03	0.02	-0.01	0.03
2 16	-0.16	-0.12	0.32	0.07	0.01	0.01	0.00	-0.01	0.03
3 9	0.00	0.00	0.00	-0.01	0.01	0.00	0.00	0.01	0.00
4 9	0.01	0.00	-0.01	-0.01	0.01	0.00	0.00	0.01	0.00
5 8	-0.06	-0.05	0.04	-0.05	-0.03	0.02	-0.01	0.00	0.00
6 8	-0.01	-0.01	0.07	-0.01	0.01	-0.06	0.00	0.01	-0.03
7 8	-0.01	-0.01	0.02	-0.09	0.00	-0.01	-0.04	0.02	-0.03
8 8	0.01	-0.01	0.00	0.01	0.01	-0.02	0.02	0.04	-0.06
9 8	0.01	0.03	-0.41	-0.01	0.00	-0.03	0.00	0.01	-0.04
10 8	0.30	0.20	-0.21	-0.07	-0.03	0.03	0.00	0.01	-0.01
11 1	-0.36	0.36	-0.49	-0.95	0.13	-0.20	-0.01	-0.55	0.82

$(FO_2SOH)OSO_2F^-$ (C_i)

	1			2			3		
	AU			AU			AU		
Frequencies --	-147.5152			11.3110			27.6357		
Red. masses --	2.0179			15.9456			15.3875		
Frc consts --	0.0259			0.0012			0.0069		
IR Inten --	4281.6144			0.4449			19.6493		
Raman Activ --	0.0000			0.0000			0.0000		
Depolar (P) --	0.0000			0.0000			0.0000		
Depolar (U) --	0.0000			0.0000			0.0000		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.02	0.05	-0.06	0.01	-0.04	0.02	0.02	0.02	0.02
2 16	-0.02	0.05	-0.06	0.01	-0.04	0.02	0.02	0.02	0.02
3 9	0.02	0.01	0.05	-0.11	0.39	-0.07	-0.31	-0.12	-0.18
4 9	0.02	0.01	0.05	-0.11	0.39	-0.07	-0.31	-0.12	-0.18
5 8	0.04	-0.02	0.02	0.10	-0.13	-0.07	-0.14	0.16	0.31
6 8	0.05	0.01	0.04	-0.17	-0.12	0.35	0.28	0.05	0.07
7 8	-0.04	-0.09	0.02	0.18	-0.12	-0.22	0.18	-0.11	-0.19
8 8	-0.04	-0.09	0.02	0.18	-0.12	-0.22	0.18	-0.11	-0.19
9 8	0.05	0.01	0.04	-0.17	-0.12	0.35	0.28	0.05	0.07
10 8	0.04	-0.02	0.02	0.10	-0.13	-0.07	-0.14	0.16	0.31
11 1	-0.76	-0.45	-0.42	0.16	-0.12	-0.19	0.07	-0.17	-0.26

	4			5			6		
	AG			AU			AG		
Frequencies --	48.7490			86.5692			94.7055		
Red. masses --	17.5566			10.3531			18.5399		
Frc consts --	0.0246			0.0457			0.0980		
IR Inten --	0.0000			599.9637			0.0000		
Raman Activ --	0.0492			0.0000			0.4355		
Depolar (P) --	0.7414			0.0000			0.2159		
Depolar (U) --	0.8515			0.0000			0.3551		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.06	0.03	0.09	0.01	-0.04	0.05	0.19	-0.07	0.17
2 16	0.06	-0.03	-0.09	0.01	-0.04	0.05	-0.19	0.07	-0.17
3 9	0.30	0.02	0.32	0.09	0.03	0.02	0.19	-0.03	0.17
4 9	-0.30	-0.02	-0.32	0.09	0.03	0.02	-0.19	0.03	-0.17
5 8	0.05	-0.04	-0.15	-0.17	0.26	-0.26	0.09	0.10	0.08
6 8	-0.20	0.03	-0.03	0.18	-0.01	0.15	0.37	-0.07	0.33
7 8	-0.28	0.12	0.36	-0.16	-0.21	-0.03	0.13	-0.25	0.09
8 8	0.28	-0.12	-0.36	-0.16	-0.21	-0.03	-0.13	0.25	-0.09
9 8	0.20	-0.03	0.03	0.18	-0.01	0.15	-0.37	0.07	-0.33
10 8	-0.05	0.04	0.15	-0.17	0.26	-0.26	-0.09	-0.10	-0.08
11 1	0.00	0.00	0.00	0.48	0.02	0.40	0.00	0.00	0.00]

	7			8			9		
	AG			AU			AG		
Frequencies --	282.2072			366.8838			370.9823		
Red. masses --	17.1781			14.3363			16.8956		
Frc consts --	0.8060			1.1370			1.3700		
IR Inten --	0.0000			0.8696			0.0000		
Raman Activ --	4.5692			0.0000			2.2046		
Depolar (P) --	0.4728			0.0000			0.7491		
Depolar (U) --	0.6420			0.0000			0.8566		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.13	-0.10	-0.06	-0.04	0.01	-0.01	0.04	-0.02	0.01
2 16	0.13	0.10	0.06	-0.04	0.01	-0.01	-0.04	0.02	-0.01
3 9	-0.09	-0.17	-0.03	0.28	-0.06	0.20	-0.28	0.13	-0.20
4 9	0.09	0.17	0.03	0.28	-0.06	0.20	0.28	-0.13	0.20
5 8	-0.26	0.20	-0.46	-0.19	0.15	0.18	0.20	-0.19	-0.13
6 8	0.03	-0.13	0.24	-0.25	-0.01	-0.07	0.29	0.01	0.01
7 8	-0.14	-0.14	-0.01	0.18	-0.10	-0.31	-0.23	0.06	0.35
8 8	0.14	0.14	0.01	0.18	-0.10	-0.31	0.23	-0.06	-0.35
9 8	-0.03	0.13	-0.24	-0.25	-0.01	-0.07	-0.29	-0.01	-0.01
10 8	0.26	-0.20	0.46	-0.19	0.15	0.18	-0.20	0.19	0.13
11 1	0.00	0.00	0.00	0.20	-0.13	-0.33	0.00	0.00	0.00

	10			11			12		
	AU			AG			AG		
Frequencies --	385.7695			427.5319			520.4200		
Red. masses --	14.5134			18.0394			18.0390		
Frc consts --	1.2726			1.9427			2.8785		
IR Inten --	173.0932			0.0000			0.0000		
Raman Activ --	0.0000			4.1765			5.3280		
Depolar (P) --	0.0000			0.4991			0.4827		
Depolar (U) --	0.0000			0.6658			0.6512		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.01	-0.09	0.04	0.09	0.17	0.03	-0.09	0.04	0.14
2 16	0.01	-0.09	0.04	-0.09	-0.17	-0.03	0.09	-0.04	-0.14
3 9	0.05	0.37	-0.01	-0.07	-0.37	-0.07	-0.23	-0.03	0.36
4 9	0.05	0.37	-0.01	0.07	0.37	0.07	0.23	0.03	-0.36
5 8	-0.07	-0.07	0.23	0.29	-0.03	-0.10	0.14	-0.12	-0.28
6 8	0.12	0.01	-0.36	-0.17	0.10	0.32	0.15	0.16	-0.23
7 8	-0.14	-0.19	0.05	0.10	0.26	-0.02	0.18	-0.08	-0.19
8 8	-0.14	-0.19	0.05	-0.10	-0.26	0.02	-0.18	0.08	0.19
9 8	0.12	0.01	-0.36	0.17	-0.10	-0.32	-0.15	-0.16	0.23
10 8	-0.07	-0.07	0.23	-0.29	0.03	0.10	-0.14	0.12	0.28
11 1	0.31	-0.11	0.26	0.00	0.00	0.00	0.00	0.00	0.00

	13	14	15
	AU	AU	AG
Frequencies --	520.4764	534.1294	556.2115
Red. masses --	17.3739	12.8143	18.2600
Frc consts --	2.7730	2.1540	3.3284
IR Inten --	7.1621	74.5117	0.0000
Raman Activ --	0.0000	0.0000	3.9780
Depolar (P) --	0.4842	0.0000	0.7424
Depolar (U) --	0.6525	0.0000	0.8521

Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	-0.08	0.03	0.14	-0.16	-0.09	-0.09	0.21	-0.02	0.13
2	16	-0.08	0.03	0.14	-0.16	-0.09	-0.09	-0.21	0.02	-0.13
3	9	-0.24	-0.01	0.36	0.12	0.08	0.10	-0.17	0.01	-0.09
4	9	-0.24	-0.01	0.36	0.12	0.08	0.10	0.17	-0.01	0.09
5	8	0.11	-0.10	-0.29	-0.17	-0.17	0.03	0.08	0.32	-0.10
6	8	0.14	0.14	-0.24	0.32	-0.07	0.12	-0.34	-0.04	-0.22
7	8	0.19	-0.08	-0.17	0.03	0.30	-0.09	0.10	-0.25	0.20
8	8	0.19	-0.08	-0.17	0.03	0.30	-0.09	-0.10	0.25	-0.20
9	8	0.14	0.14	-0.24	0.32	-0.07	0.12	0.34	0.04	0.22
10	8	0.11	-0.10	-0.29	-0.17	-0.17	0.03	-0.08	-0.32	0.10
11	1	0.14	-0.06	-0.12	-0.07	0.52	-0.19	0.00	0.00	0.00

	16	17	18
	AU	AG	AG
Frequencies --	626.1044	667.7637	729.0586
Red. masses --	8.7258	17.4559	22.6716
Frc consts --	2.0153	4.5861	7.1000
IR Inten --	1014.4126	0.0000	0.0000
Raman Activ --	0.0000	11.1260	10.1853
Depolar (P) --	0.0000	0.0295	0.0857
Depolar (U) --	0.0000	0.0574	0.1578

Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	0.07	-0.09	-0.10	0.11	-0.16	-0.02	-0.18	-0.05	0.37
2	16	0.07	-0.09	-0.10	-0.11	0.16	0.02	0.18	0.05	-0.37
3	9	-0.13	0.08	0.12	-0.11	0.08	0.16	0.24	0.01	-0.38
4	9	-0.13	0.08	0.12	0.11	-0.08	-0.16	-0.24	-0.01	0.38
5	8	-0.11	0.20	-0.05	-0.11	0.16	-0.06	-0.09	-0.04	-0.16
6	8	-0.04	-0.19	-0.07	0.07	-0.24	-0.03	0.06	0.07	-0.09
7	8	0.17	0.07	0.19	0.23	0.51	0.07	0.23	0.15	0.02
8	8	0.17	0.07	0.19	-0.23	-0.51	-0.07	-0.23	-0.15	-0.02
9	8	-0.04	-0.19	-0.07	-0.07	0.24	0.03	-0.06	-0.07	0.09
10	8	-0.11	0.20	-0.05	0.11	-0.16	0.06	0.09	0.04	0.16
11	1	-0.65	-0.11	-0.33	0.00	0.00	0.00	0.00	0.00	0.00

	19	20	21
	AU	AU	AG
Frequencies --	780.8860	1031.1550	1039.0128
Red. masses --	7.9761	6.6208	16.8984
Frc consts --	2.8656	4.1477	10.7483
IR Inten --	1408.7442	417.2553	0.0000
Raman Activ --	0.0000	0.0000	53.8354
Depolar (P) --	0.0000	0.0523	0.0548
Depolar (U) --	0.0000	0.0994	0.1039

Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	-0.14	0.01	0.13	-0.04	-0.01	0.12	0.00	-0.03	0.16
2	16	-0.14	0.01	0.13	-0.04	-0.01	0.12	0.00	0.03	-0.16
3	9	0.12	0.01	-0.20	0.01	0.00	-0.03	0.00	0.00	-0.02
4	9	0.12	0.01	-0.20	0.01	0.00	-0.03	0.00	0.00	0.02
5	8	-0.08	0.00	-0.10	0.17	0.14	0.02	0.25	0.18	0.05
6	8	0.01	0.03	-0.05	0.03	-0.23	-0.06	0.03	-0.28	-0.07
7	8	0.22	-0.05	0.15	-0.12	0.11	-0.14	-0.39	0.09	-0.35
8	8	0.22	-0.05	0.15	-0.12	0.11	-0.14	0.39	-0.09	0.35
9	8	0.01	0.03	-0.05	0.03	-0.23	-0.06	-0.03	0.28	0.07
10	8	-0.08	0.00	-0.10	0.17	0.14	0.02	-0.25	-0.18	-0.05
11	1	-0.60	-0.23	-0.47	-0.57	-0.17	-0.55	0.00	0.00	0.00

	22	23	24
	AU	AG	AU
Frequencies --	1130.5691	1222.2960	1305.1277
Red. masses --	1.0404	19.8948	3.6504
Frc consts --	0.7835	17.5123	3.6635
IR Inten --	72.6162	0.0000	175.8275
Raman Activ --	0.0000	20.9754	0.0000
Depolar (P) --	0.0000	0.1506	0.0000
Depolar (U) --	0.0000	0.2617	0.0000

Atom	AN	X	Y	Z	X	Y	Z	X	Y	Z
1	16	0.00	0.00	0.00	0.29	-0.16	0.10	0.12	-0.03	0.07
2	16	0.00	0.00	0.00	-0.29	0.16	-0.10	0.12	-0.03	0.07
3	9	0.00	0.00	0.00	-0.02	0.01	0.00	0.00	0.00	-0.01
4	9	0.00	0.00	0.00	0.02	-0.01	0.00	0.00	0.00	-0.01
5	8	0.00	0.00	0.00	-0.28	-0.18	-0.07	-0.14	-0.08	-0.04
6	8	0.00	0.00	0.00	-0.08	0.37	0.05	-0.02	0.08	0.00
7	8	-0.01	0.01	0.03	-0.25	0.08	-0.21	-0.06	0.06	-0.06
8	8	-0.01	0.01	0.03	0.25	-0.08	0.21	-0.06	0.06	-0.06
9	8	0.00	0.00	0.00	0.08	-0.37	-0.05	-0.02	0.08	0.00
10	8	0.00	0.00	0.00	0.28	0.18	0.07	-0.14	-0.08	-0.04
11	1	0.62	-0.29	-0.73	0.00	0.00	0.00	-0.71	-0.18	-0.57

	25			26			27		
	AU			AG			AU		
Frequencies --	1340.6316			1346.8234			1499.7605		
Red. masses --	7.1245			20.8743			1.1566		
Frc consts --	7.5443			22.3092			1.5327		
IR Inten --	684.5031			0.0000			372.8472		
Raman Activ --	0.0000			13.5166			0.0000		
Depolar (P) --	0.7182			0.7101			0.0000		
Depolar (U) --	0.8360			0.8305			0.0000		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.05	0.21	0.03	0.16	0.35	0.09	-0.01	-0.03	0.00
2 16	0.05	0.21	0.03	-0.16	-0.35	-0.09	-0.01	-0.03	0.00
3 9	0.00	-0.01	0.00	-0.01	-0.01	0.00	0.00	0.00	0.00
4 9	0.00	-0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00
5 8	-0.15	-0.13	-0.04	-0.33	-0.26	-0.09	0.01	0.01	0.00
6 8	0.03	-0.25	-0.04	0.04	-0.39	-0.07	0.00	0.03	0.00
7 8	0.02	0.00	0.01	-0.02	-0.02	-0.01	0.01	0.04	-0.01
8 8	0.02	0.00	0.01	0.02	0.02	0.01	0.01	0.04	-0.01
9 8	0.03	-0.25	-0.04	-0.04	0.39	0.07	0.00	0.03	0.00
10 8	-0.15	-0.13	-0.04	0.33	0.26	0.09	0.01	0.01	0.00
11 1	0.32	-0.53	0.55	0.00	0.00	0.00	0.05	-0.91	0.40

$(FO_2SOH)_2O_2SOF^-$ (C_s)

	1			2			3		
	A″			A'			A'		
Frequencies --	0.7156			6.7902			8.5383		
Red. masses --	16.2702			16.8236			18.4202		
Frc consts --	0.0000			0.0005			0.0008		
IR Inten --	0.0003			0.4491			0.0989		
Raman Activ --	0.0217			0.0125			0.0748		
Depolar (P) --	0.7500			0.7447			0.7415		
Depolar (U) --	0.8571			0.8537			0.8515		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.00	-0.14	0.04	0.00	0.17	0.20	0.00
2 8	0.00	0.00	-0.02	0.15	0.17	0.00	0.20	0.21	0.00
3 9	0.00	0.00	0.07	-0.37	0.32	0.00	0.15	0.22	0.00
4 8	-0.04	-0.03	-0.01	-0.23	-0.12	0.00	0.17	0.18	0.00
5 1	-0.12	-0.11	-0.03	-0.15	-0.12	-0.01	0.03	0.03	-0.04
6 8	-0.21	-0.17	-0.04	-0.12	-0.14	-0.03	-0.08	-0.08	-0.07
7 16	0.02	-0.02	0.00	0.10	-0.05	0.04	-0.08	-0.12	-0.05
8 9	-0.10	0.41	0.02	0.02	0.18	0.18	-0.12	0.10	-0.22
9 8	0.41	-0.03	0.04	0.30	-0.05	0.05	0.12	-0.11	0.11
10 8	-0.12	-0.17	-0.03	0.12	-0.11	0.00	-0.26	-0.31	-0.09
11 8	0.04	0.03	-0.01	-0.23	-0.12	0.00	0.17	0.18	0.00
12 1	0.12	0.11	-0.03	-0.15	-0.12	0.01	0.03	0.03	0.04
13 8	0.21	0.17	-0.04	-0.12	-0.14	0.03	-0.08	-0.08	0.07
14 16	-0.02	0.02	0.00	0.10	-0.05	-0.04	-0.08	-0.12	0.05
15 9	0.10	-0.41	0.02	0.02	0.18	-0.18	-0.12	0.10	0.22
16 8	-0.41	0.03	0.04	0.30	-0.05	-0.05	0.12	-0.11	-0.11
17 8	0.12	0.17	-0.03	0.12	-0.11	0.00	-0.26	-0.31	0.09

	4			5			6		
	A'			A″			A″		
Frequencies --	22.8195			24.3303			45.8906		
Red. masses --	16.1335			14.9795			15.4864		
Frc consts --	0.0049			0.0052			0.0192		
IR Inten --	0.1010			0.1347			0.0286		
Raman Activ --	0.0311			0.0067			0.0088		
Depolar (P) --	0.7500			0.7500			0.7500		
Depolar (U) --	0.8571			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.15	-0.17	0.00	0.00	0.00	-0.02	0.00	0.00	0.00
2 8	0.48	-0.03	0.00	0.00	0.00	-0.15	0.00	0.00	-0.29
3 9	-0.09	0.14	0.00	0.00	0.00	0.44	0.00	0.00	0.33
4 8	0.05	-0.34	0.00	-0.25	-0.23	-0.09	-0.08	-0.29	0.05
5 1	0.06	-0.19	0.05	-0.20	-0.15	-0.07	0.18	-0.11	0.08
6 8	0.01	-0.08	0.11	-0.15	-0.11	-0.05	0.28	0.04	0.14
7 16	-0.07	0.08	-0.04	0.00	0.01	-0.04	0.04	0.03	0.01
8 9	-0.06	0.10	-0.13	-0.02	-0.05	0.23	0.09	0.03	-0.31
9 8	-0.01	0.06	-0.19	-0.05	-0.01	-0.20	0.07	0.03	0.03
10 8	-0.20	0.20	0.07	0.19	0.15	-0.02	-0.20	0.02	0.08
11 8	0.05	-0.34	0.00	0.25	0.23	-0.09	0.08	0.29	0.05
12 1	0.06	-0.19	-0.05	0.20	0.15	-0.07	-0.18	0.11	0.08
13 8	0.01	-0.08	-0.11	0.15	0.11	-0.05	-0.28	-0.04	0.14
14 16	-0.07	0.08	0.04	0.00	-0.01	-0.04	-0.04	-0.03	0.01
15 9	-0.06	0.10	0.13	0.02	0.05	0.23	-0.09	-0.03	-0.31
16 8	-0.01	0.06	0.19	0.05	0.01	-0.20	-0.07	-0.03	0.03
17 8	-0.20	0.20	-0.07	-0.19	-0.15	-0.02	0.20	-0.02	0.08

	7			8			9		
	A'			A″			A'		
Frequencies --	46.6300			61.2637			64.5617		
Red. masses --	16.8203			13.4395			17.4461		
Frc consts --	0.0215			0.0297			0.0428		
IR Inten --	0.4730			4.5390			0.5306		
Raman Activ --	0.0220			0.0155			0.1400		
Depolar (P) --	0.6990			0.7500			0.0282		
Depolar (U) --	0.8228			0.8571			0.0549		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.16	0.07	0.00	0.00	0.00	0.06	0.11	-0.06	0.00
2 8	0.10	0.04	0.00	0.00	0.00	0.32	0.18	-0.03	0.00
3 9	0.20	0.02	0.00	0.00	0.00	0.27	0.08	0.00	0.00
4 8	0.18	0.10	0.00	-0.28	0.11	-0.14	0.10	-0.09	0.00
5 1	-0.14	-0.08	-0.03	-0.13	0.25	-0.14	-0.02	0.11	0.19
6 8	-0.32	-0.19	-0.06	0.04	0.24	-0.15	-0.04	0.14	0.19
7 16	-0.06	-0.02	-0.02	0.03	0.02	-0.03	-0.06	0.02	0.26
8 9	-0.12	-0.03	0.36	0.04	0.01	-0.09	-0.05	0.03	0.22
9 8	-0.07	-0.05	-0.22	-0.02	0.05	0.22	-0.08	0.04	0.41
10 8	0.16	0.13	-0.01	0.07	-0.18	-0.14	-0.05	-0.10	0.19
11 8	0.18	0.10	0.00	0.28	-0.11	-0.14	0.10	-0.09	0.00
12 1	-0.14	-0.08	0.03	0.13	-0.25	-0.14	-0.02	0.11	-0.19
13 8	-0.32	-0.19	0.06	-0.04	-0.24	-0.15	-0.04	0.14	-0.19
14 16	-0.06	-0.02	0.02	-0.03	-0.02	-0.03	-0.06	0.02	-0.26
15 9	-0.12	-0.03	-0.36	-0.04	-0.01	-0.09	-0.05	0.03	-0.22
16 8	-0.07	-0.05	0.22	0.02	-0.05	0.22	-0.08	0.04	-0.41
17 8	0.16	0.13	0.01	-0.07	0.18	-0.14	-0.05	-0.10	-0.19

	10			11			12		
	A″			A’			A″		
Frequencies --	88.4395			166.2732			244.5003		
Red. masses --	17.2688			12.5165			14.6689		
Frc consts --	0.0796			0.2039			0.5167		
IR Inten --	6.7403			1.9709			206.3230		
Raman Activ --	0.1073			0.2050			0.1600		
Depolar (P) --	0.7500			0.6820			0.7500		
Depolar (U) --	0.8571			0.8110			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.27	−0.08	0.13	0.00	0.00	0.00	0.14
2 8	0.00	0.00	0.50	−0.19	0.08	0.00	0.00	0.00	−0.20
3 9	0.00	0.00	0.16	0.01	0.05	0.00	0.00	0.00	0.18
4 8	−0.01	0.16	0.21	0.03	0.14	0.07	0.28	−0.11	0.36
5 1	0.09	−0.13	−0.02	0.15	−0.21	0.28	0.04	0.12	−0.24
6 8	0.07	−0.19	−0.02	0.12	−0.22	0.24	−0.07	0.12	−0.13
7 16	0.05	−0.04	−0.13	0.01	−0.05	0.12	0.00	0.03	−0.11
8 9	0.05	−0.04	−0.15	0.04	−0.06	0.00	−0.05	0.07	0.00
9 8	0.09	−0.06	−0.33	0.11	−0.08	−0.13	−0.11	0.06	0.08
10 8	−0.03	0.12	−0.02	−0.17	0.14	0.27	0.15	−0.10	−0.21
11 8	0.01	−0.16	0.21	0.03	0.14	−0.07	−0.28	0.11	0.36
12 1	−0.09	0.13	−0.02	0.15	−0.21	−0.28	−0.04	−0.12	−0.24
13 8	−0.07	0.19	−0.02	0.12	−0.22	−0.24	0.07	−0.12	−0.13
14 16	−0.05	0.04	−0.13	0.01	−0.05	−0.12	0.00	−0.03	−0.11
15 9	−0.05	0.04	−0.15	0.04	−0.06	0.00	0.05	−0.07	0.00
16 8	−0.09	0.06	−0.33	0.11	−0.08	0.13	0.11	−0.06	0.08
17 8	0.03	−0.12	−0.02	−0.17	0.14	−0.27	−0.15	0.10	−0.21

	13			14			15		
	A″			A’			A″		
Frequencies --	363.8789			364.4187			373.4277		
Red. masses --	13.5610			14.0851			14.4652		
Frc consts --	1.0579			1.1021			1.1885		
IR Inten --	0.0971			1.1952			0.4821		
Raman Activ --	1.7339			0.1968			0.6485		
Depolar (P) --	0.7500			0.7498			0.7500		
Depolar (U) --	0.8571			0.8570			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	−0.05
2 8	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	−0.27
3 9	0.00	0.00	−0.09	0.00	0.00	0.00	0.00	0.00	0.35
4 8	−0.03	−0.07	0.02	−0.01	0.00	0.00	0.17	0.31	−0.05
5 1	−0.24	−0.21	−0.01	0.25	0.17	0.02	−0.05	0.27	−0.05
6 8	−0.30	−0.20	0.00	0.33	0.19	0.02	−0.17	0.08	−0.11
7 16	0.01	0.02	0.03	−0.01	−0.02	−0.04	0.00	0.02	0.01
8 9	0.08	−0.05	−0.31	−0.09	0.09	0.31	0.07	−0.22	−0.01
9 8	−0.02	0.04	0.25	−0.02	−0.05	−0.25	0.23	0.02	0.03
10 8	0.22	0.18	0.05	−0.19	−0.21	−0.07	−0.14	0.10	0.09
11 8	0.03	0.07	0.02	−0.01	0.00	0.00	−0.17	−0.31	−0.05
12 1	0.24	0.21	−0.01	0.25	0.17	−0.02	0.05	−0.27	−0.05
13 8	0.30	0.20	0.00	0.33	0.19	−0.02	0.17	−0.08	−0.11
14 16	−0.01	−0.02	0.03	−0.01	−0.02	0.04	0.00	−0.02	0.01
15 9	−0.08	0.05	−0.31	−0.09	0.09	−0.31	−0.07	0.22	−0.01
16 8	0.02	−0.04	0.25	−0.02	−0.05	0.25	−0.23	−0.02	0.03
17 8	−0.22	−0.18	0.05	−0.19	−0.21	0.07	0.14	−0.10	0.09

	16			17			18		
	A'			A'			A''		
Frequencies --	376.0142			394.2872			399.6109		
Red. masses --	14.0393			15.3790			14.4210		
Frc consts --	1.1695			1.4087			1.3568		
IR Inten --	1.5330			4.0584			139.7628		
Raman Activ --	1.0237			2.6217			1.2952		
Depolar (P) --	0.7053			0.7495			0.7500		
Depolar (U) --	0.8272			0.8568			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.02	0.03	0.00	-0.08	0.10	0.00	0.00	0.00	0.06
2 8	0.28	0.17	0.00	0.30	0.27	0.00	0.00	0.00	0.18
3 9	0.20	-0.25	0.00	0.28	-0.32	0.00	0.00	0.00	-0.28
4 8	-0.24	0.03	-0.12	-0.26	0.01	-0.06	-0.10	-0.32	0.13
5 1	-0.15	0.24	-0.10	0.01	-0.20	0.14	-0.10	0.14	-0.23
6 8	-0.11	0.14	-0.12	0.11	-0.14	0.12	-0.11	0.17	-0.13
7 16	0.00	0.02	0.00	0.00	-0.04	0.04	0.00	0.04	-0.06
8 9	0.06	-0.23	0.06	-0.04	0.22	-0.07	0.03	-0.24	0.09
9 8	0.26	0.02	-0.01	-0.22	-0.05	-0.02	0.24	0.06	0.03
10 8	-0.21	0.07	0.09	0.17	-0.04	-0.02	-0.20	0.04	0.00
11 8	-0.24	0.03	0.12	-0.26	0.01	0.06	0.10	0.32	0.13
12 1	-0.15	0.24	0.10	0.01	-0.20	-0.14	0.10	-0.14	-0.23
13 8	-0.11	0.14	0.12	0.11	-0.14	-0.12	0.11	-0.17	-0.13
14 16	0.00	0.02	0.00	0.00	-0.04	-0.04	0.00	-0.04	-0.06
15 9	0.06	-0.23	-0.06	-0.04	0.22	0.07	-0.03	0.24	0.09
16 8	0.26	0.02	0.01	-0.22	-0.05	0.02	-0.24	-0.06	0.03
17 8	-0.21	0.07	-0.09	0.17	-0.04	0.02	0.20	-0.04	0.00

	19			20			21		
	A''			A'			A'		
Frequencies --	517.4767			517.8178			522.8484		
Red. masses --	17.2575			17.6961			13.4229		
Frc consts --	2.7228			2.7956			2.1620		
IR Inten --	22.4213			18.9926			18.7385		
Raman Activ --	0.4989			4.4014			3.7158		
Depolar (P) --	0.7500			0.6168			0.7340		
Depolar (U) --	0.8571			0.7630			0.8466		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	-0.04	0.00	-0.02	0.00	0.08	0.16	0.00
2 8	0.00	0.00	0.06	0.03	-0.01	0.00	-0.29	0.01	0.00
3 9	0.00	0.00	0.03	-0.04	-0.02	0.00	0.35	0.19	0.00
4 8	0.03	-0.02	-0.01	0.01	0.03	-0.01	-0.14	-0.27	0.00
5 1	-0.03	-0.11	-0.12	-0.08	-0.04	-0.07	0.09	-0.36	0.04
6 8	-0.15	-0.18	-0.11	-0.18	-0.15	-0.09	0.04	-0.15	0.10
7 16	0.18	0.06	-0.04	0.18	0.07	0.00	-0.03	0.10	-0.07
8 9	0.36	0.08	0.11	0.38	0.08	0.08	0.02	-0.10	0.07
9 8	-0.31	0.09	0.03	-0.31	0.08	-0.04	0.04	0.14	0.10
10 8	-0.32	-0.11	0.03	-0.30	-0.16	0.04	-0.05	-0.06	-0.17
11 8	-0.03	0.02	-0.01	0.01	0.03	0.01	-0.14	-0.27	0.00
12 1	0.03	0.11	-0.12	-0.08	-0.04	0.07	0.09	-0.36	-0.04
13 8	0.15	0.18	-0.11	-0.18	-0.15	0.09	0.04	-0.15	-0.10
14 16	-0.18	-0.06	-0.04	0.18	0.07	0.00	-0.03	0.10	0.07
15 9	-0.36	-0.08	0.11	0.38	0.08	-0.08	0.02	-0.10	-0.07
16 8	0.31	-0.09	0.03	-0.31	0.08	0.04	0.04	0.14	-0.10
17 8	0.32	0.11	0.03	-0.30	-0.16	-0.04	-0.05	-0.06	0.17

	22			23			24		
	A″			A’			A″		
Frequencies --	524.1989			525.4357			533.0415		
Red. masses --	14.8286			13.5700			9.9172		
Frc consts --	2.4007			2.2073			1.6602		
IR Inten --	267.3931			27.3733			5.7455		
Raman Activ --	1.5495			3.2608			0.5113		
Depolar (P) --	0.7500			0.4560			0.7500		
Depolar (U) --	0.8571			0.6264			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.12	0.16	0.03	0.00	0.00	0.00	-0.08
2 8	0.00	0.00	-0.16	-0.24	-0.15	0.00	0.00	0.00	0.13
3 9	0.00	0.00	-0.08	0.22	0.25	0.00	0.00	0.00	0.09
4 8	-0.10	0.05	0.04	-0.17	-0.11	-0.16	0.08	-0.01	-0.07
5 1	-0.15	0.06	0.27	-0.19	0.28	-0.14	0.22	-0.42	0.12
6 8	-0.18	0.06	0.18	-0.02	0.15	-0.16	0.09	-0.22	0.16
7 16	-0.03	0.14	0.15	0.05	-0.14	0.05	-0.06	0.13	-0.08
8 9	0.12	-0.09	-0.10	0.01	0.14	-0.05	-0.03	-0.13	0.08
9 8	0.04	0.11	-0.29	-0.09	-0.17	-0.06	0.08	0.17	0.13
10 8	0.07	-0.32	-0.11	0.00	0.11	0.21	-0.02	-0.05	-0.21
11 8	0.10	-0.05	0.04	-0.17	-0.11	0.16	-0.08	0.01	-0.07
12 1	0.15	-0.06	0.27	-0.19	0.28	0.14	-0.22	0.42	0.12
13 8	0.18	-0.06	0.18	-0.02	0.15	0.16	-0.09	0.22	0.16
14 16	0.03	-0.14	0.15	0.05	-0.14	-0.05	0.06	-0.13	-0.08
15 9	-0.12	0.09	-0.10	0.01	0.14	0.05	0.03	0.13	0.08
16 8	-0.04	-0.11	-0.29	-0.09	-0.17	0.06	-0.08	-0.17	0.13
17 8	-0.07	0.32	-0.11	0.00	0.11	-0.21	0.02	0.05	-0.21

	25			26			27		
	A’			A″			A’		
Frequencies --	533.2960			557.9219			616.0260		
Red. masses --	14.6457			17.3564			15.9629		
Frc consts --	2.4541			3.1831			3.5691		
IR Inten --	20.9002			13.8662			10.6299		
Raman Activ --	2.2355			4.4739			6.9023		
Depolar (P) --	0.4758			0.7500			0.6821		
Depolar (U) --	0.6448			0.8571			0.8110		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.01	0.00	0.00	0.00	0.00	-0.30	-0.12	0.23	0.00
2 8	0.04	0.03	0.00	0.00	0.00	0.51	-0.10	0.34	0.00
3 9	-0.06	-0.06	0.00	0.00	0.00	0.23	0.02	-0.20	0.00
4 8	0.02	0.03	0.02	0.34	-0.23	-0.11	0.18	-0.34	0.36
5 1	0.15	-0.17	-0.22	0.05	0.14	-0.02	0.01	0.16	-0.14
6 8	0.19	-0.16	-0.16	-0.11	0.14	0.02	-0.09	0.17	-0.10
7 16	0.04	-0.08	-0.19	0.00	-0.01	0.10	0.04	-0.06	-0.01
8 9	-0.06	0.06	0.15	0.02	0.01	-0.09	0.02	0.03	-0.02
9 8	-0.06	-0.04	0.34	0.01	-0.04	-0.16	-0.02	-0.07	-0.03
10 8	-0.14	0.29	0.03	0.07	-0.09	0.07	-0.01	0.03	0.07
11 8	0.02	0.03	-0.02	-0.34	0.23	-0.11	0.18	-0.34	-0.36
12 1	0.15	-0.17	0.22	-0.05	-0.14	-0.02	0.01	0.16	0.14
13 8	0.19	-0.16	0.16	0.11	-0.14	0.02	-0.09	0.17	0.10
14 16	0.04	-0.08	0.19	0.00	0.01	0.10	0.04	-0.06	0.01
15 9	-0.06	0.06	-0.15	-0.02	-0.01	-0.09	0.02	0.03	0.02
16 8	-0.06	-0.04	-0.34	-0.01	0.04	-0.16	-0.02	-0.07	0.03
17 8	-0.14	0.29	-0.03	-0.07	0.09	0.07	-0.01	0.03	-0.07

	28			29			30		
	A'			A″			A'		
Frequencies --	739.3441			744.3287			747.1580		
Red. masses --	19.3096			19.8833			20.3587		
Frc consts --	6.2189			6.4904			6.6962		
IR Inten --	241.9703			5.8966			308.9765		
Raman Activ --	3.5927			0.0587			29.1164		
Depolar (P) --	0.0816			0.7500			0.0218		
Depolar (U) --	0.1509			0.8571			0.0427		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.44	0.29	0.00	0.00	0.00	0.02	-0.05	-0.04	0.00
2 8	-0.18	0.07	0.00	0.00	0.00	0.01	0.02	0.00	0.00
3 9	-0.51	-0.38	0.00	0.00	0.00	0.00	0.07	0.05	0.00
4 8	-0.05	-0.07	-0.20	0.01	-0.02	-0.01	0.01	0.01	0.04
5 1	-0.19	-0.20	-0.08	0.16	0.08	0.15	-0.16	-0.05	-0.13
6 8	0.02	-0.04	0.03	0.00	0.08	0.08	0.00	-0.08	-0.10
7 16	0.03	0.02	0.02	-0.34	-0.10	-0.05	0.34	0.09	0.05
8 9	-0.06	-0.02	-0.01	0.47	0.13	0.08	-0.47	-0.13	-0.07
9 8	-0.01	0.04	-0.02	0.08	-0.15	0.04	-0.08	0.15	-0.04
10 8	0.00	-0.03	0.02	0.04	0.11	-0.13	-0.04	-0.10	0.13
11 8	-0.05	-0.07	0.20	-0.01	0.02	-0.01	0.01	0.01	-0.04
12 1	-0.19	-0.20	0.08	-0.16	-0.08	0.15	-0.16	-0.05	0.13
13 8	0.02	-0.04	-0.03	0.00	-0.08	0.08	0.00	-0.08	0.10
14 16	0.03	0.02	-0.02	0.34	0.10	-0.05	0.34	0.09	-0.05
15 9	-0.06	-0.02	0.01	-0.47	-0.13	0.08	-0.47	-0.13	0.07
16 8	-0.01	0.04	0.02	-0.08	0.15	0.04	-0.08	0.15	0.04
17 8	0.00	-0.03	-0.02	-0.04	-0.11	-0.13	-0.04	-0.10	-0.13

	31			32			33		
	A″			A'			A″		
Frequencies --	933.4890			936.1050			946.5218		
Red. masses --	1.3866			1.6909			3.4246		
Frc consts --	0.7119			0.8730			1.8077		
IR Inten --	136.3010			66.1975			159.2273		
Raman Activ --	0.3841			5.9340			0.9414		
Depolar (P) --	0.7500			0.0479			0.7500		
Depolar (U) --	0.8571			0.0914			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.01	-0.01	0.00	0.00	0.00	0.00	-0.02
2 8	0.00	0.00	0.00	-0.01	0.02	0.00	0.00	0.00	0.00
3 9	0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	0.00	0.00
4 8	-0.01	-0.02	0.00	0.01	-0.02	-0.03	-0.03	0.01	0.00
5 1	0.56	0.41	0.09	0.56	0.40	0.07	0.54	0.33	0.18
6 8	0.01	-0.05	-0.07	0.02	-0.06	-0.09	-0.11	0.07	0.18
7 16	-0.02	0.01	0.02	-0.03	0.01	0.03	0.07	-0.03	-0.06
8 9	0.00	0.00	0.00	0.00	0.00	0.00	-0.02	0.00	0.00
9 8	0.00	0.03	0.00	0.00	0.04	-0.01	-0.01	-0.07	0.02
10 8	0.01	-0.01	0.02	0.02	-0.02	0.03	-0.02	0.04	-0.06
11 8	0.01	0.02	0.00	0.01	-0.02	0.03	0.03	-0.01	0.00
12 1	-0.56	-0.41	0.09	0.56	0.40	-0.07	-0.54	-0.33	0.18
13 8	-0.01	0.05	-0.07	0.02	-0.06	0.09	0.11	-0.07	0.18
14 16	0.02	-0.01	0.02	-0.03	0.01	-0.03	-0.07	0.03	-0.06
15 9	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
16 8	0.00	-0.03	0.00	0.00	0.04	0.01	0.01	0.07	0.02
17 8	-0.01	0.01	0.02	0.02	-0.02	-0.03	0.02	-0.04	-0.06

	34			35			36		
	A'			A'			A''		
Frequencies --	951.0537			1038.5200			1151.2460		
Red. masses --	2.4062			15.3767			9.1142		
Frc consts --	1.2823			9.7711			7.1171		
IR Inten --	310.8521			58.9358			2094.9627		
Raman Activ --	12.6841			88.4265			2.7574		
Depolar (P) --	0.0628			0.1088			0.7500		
Depolar (U) --	0.1181			0.1963			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.02	0.00	0.00	0.21	0.07	0.00	0.00	0.00	0.28
2 8	0.00	-0.02	0.00	0.15	-0.38	0.00	0.00	0.00	-0.02
3 9	-0.01	0.00	0.00	-0.01	-0.01	0.00	0.00	0.00	-0.01
4 8	-0.03	0.01	0.00	-0.27	0.12	0.49	0.15	-0.09	-0.25
5 1	0.55	0.36	0.18	0.15	0.12	-0.11	-0.26	0.26	0.39
6 8	-0.09	0.04	0.13	0.02	-0.03	-0.07	0.01	-0.02	-0.05
7 16	0.06	-0.02	-0.05	-0.04	0.00	0.01	0.05	0.05	0.08
8 9	-0.02	0.00	0.00	0.01	0.00	0.00	-0.02	-0.01	0.00
9 8	-0.01	-0.05	0.02	0.01	0.06	-0.01	-0.01	-0.17	0.02
10 8	-0.02	0.03	-0.05	0.02	-0.03	0.05	-0.06	0.09	-0.17
11 8	-0.03	0.01	0.00	-0.27	0.12	-0.49	-0.15	0.09	-0.25
12 1	0.55	0.36	-0.18	0.15	0.12	0.11	0.26	-0.26	0.39
13 8	-0.09	0.04	-0.13	0.02	-0.03	0.07	-0.01	0.02	-0.05
14 16	0.06	-0.02	0.05	-0.04	0.00	-0.01	-0.05	-0.05	0.08
15 9	-0.02	0.00	0.00	0.01	0.00	0.00	0.02	0.01	0.00
16 8	-0.01	-0.05	-0.02	0.01	0.06	0.01	0.01	0.17	0.02
17 8	-0.02	0.03	0.05	0.02	-0.03	-0.05	0.06	-0.09	-0.17

	37			38			39		
	A'			A''			A'		
Frequencies --	1202.8033			1221.9638			1301.0999		
Red. masses --	14.4633			18.8510			19.3654		
Frc consts --	12.3284			16.5845			19.3152		
IR Inten --	160.4250			8.7761			230.0461		
Raman Activ --	39.0975			6.4724			11.5064		
Depolar (P) --	0.0711			0.7500			0.7500		
Depolar (U) --	0.1328			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.04	0.00	0.00	0.00	0.30	-0.27	0.44	0.00
2 8	0.03	-0.07	0.00	0.00	0.00	-0.03	0.31	-0.68	0.00
3 9	-0.01	-0.01	0.00	0.00	0.00	-0.01	0.00	-0.02	0.00
4 8	-0.01	-0.01	0.04	0.14	-0.07	-0.29	0.12	-0.09	-0.17
5 1	-0.18	0.25	0.18	-0.03	-0.01	0.15	0.05	-0.14	0.09
6 8	0.05	-0.07	-0.12	-0.05	0.06	0.12	-0.01	0.02	-0.01
7 16	0.04	0.15	0.21	-0.02	-0.15	-0.21	0.00	-0.02	-0.02
8 9	-0.02	-0.01	-0.01	0.01	0.01	0.01	0.00	0.00	0.00
9 8	-0.01	-0.37	0.02	0.00	0.35	-0.01	0.00	0.03	0.00
10 8	-0.10	0.15	-0.33	0.08	-0.13	0.30	0.00	-0.01	0.03
11 8	-0.01	-0.01	-0.04	-0.14	0.07	-0.29	0.12	-0.09	0.17
12 1	-0.18	0.25	-0.18	0.03	0.01	0.15	0.05	-0.14	-0.09
13 8	0.05	-0.07	0.12	0.05	-0.06	0.12	-0.01	0.02	0.01
14 16	0.04	0.15	-0.21	0.02	0.15	-0.21	0.00	-0.02	0.02
15 9	-0.02	-0.01	0.01	-0.01	-0.01	0.01	0.00	0.00	0.00
16 8	-0.01	-0.37	-0.02	0.00	-0.35	-0.01	0.00	0.03	0.00
17 8	-0.10	0.15	0.33	-0.08	0.13	0.30	0.00	-0.01	-0.03

	40			41			42		
	A'			A″			A″		
Frequencies --	1340.3355			1342.8241			1417.2873		
Red. masses --	1.5901			1.7122			2.8487		
Frc consts --	1.6831			1.8190			3.3714		
IR Inten --	70.9547			127.0268			33.0315		
Raman Activ --	10.7756			1.5071			1.4943		
Depolar (P) --	0.6242			0.7500			0.7500		
Depolar (U) --	0.7686			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.02
2 8	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
3 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 8	0.01	-0.01	0.00	0.01	0.00	-0.03	0.00	0.00	-0.02
5 1	-0.41	0.47	0.31	0.41	-0.47	-0.30	0.38	-0.45	-0.32
6 8	0.02	-0.02	0.01	-0.02	0.03	-0.01	-0.02	0.03	-0.01
7 16	0.01	-0.06	0.02	-0.01	0.06	-0.02	0.02	-0.09	0.08
8 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 8	0.00	0.08	-0.01	0.00	-0.09	0.01	0.00	0.11	-0.02
10 8	-0.02	0.03	-0.05	0.02	-0.03	0.06	-0.03	0.06	-0.11
11 8	0.01	-0.01	0.00	-0.01	0.00	-0.03	0.00	0.00	-0.02
12 1	-0.41	0.47	-0.31	-0.41	0.47	-0.30	-0.38	0.45	-0.32
13 8	0.02	-0.02	-0.01	0.02	-0.03	-0.01	0.02	-0.03	-0.01
14 16	0.01	-0.06	-0.02	0.01	-0.06	-0.02	-0.02	0.09	0.08
15 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 8	0.00	0.08	0.01	0.00	0.09	0.01	0.00	-0.11	-0.02
17 8	-0.02	0.03	0.05	-0.02	0.03	0.06	0.03	-0.06	-0.11

	43			44			45		
	A'			A″			A'		
Frequencies --	1417.3378			2507.7074			2601.6318		
Red. masses --	2.9149			1.0989			1.0857		
Frc consts --	3.4500			4.0715			4.3298		
IR Inten --	392.9315			7432.2923			159.2030		
Raman Activ --	1.7218			15.2732			515.1999		
Depolar (P) --	0.5998			0.7500			0.3174		
Depolar (U) --	0.7498			0.8571			0.4819		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.01	0.00	0.00	0.00	-0.01	-0.01	0.01	0.00
2 8	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01	0.00
3 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4 8	0.01	-0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
5 1	-0.38	0.45	0.32	0.10	-0.32	0.62	-0.09	0.31	-0.63
6 8	0.02	-0.03	0.01	-0.01	0.02	-0.04	0.01	-0.02	0.04
7 16	-0.02	0.09	-0.08	0.00	0.00	0.00	0.00	0.00	0.00
8 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 8	0.00	-0.11	0.02	0.00	0.00	0.00	0.00	0.00	0.00
10 8	0.03	-0.06	0.11	0.00	0.00	0.01	0.00	0.00	0.00
11 8	0.01	-0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00
12 1	-0.38	0.45	-0.32	-0.10	0.32	0.62	-0.09	0.31	0.63
13 8	0.02	-0.03	-0.01	0.01	-0.02	-0.04	0.01	-0.02	-0.04
14 16	-0.02	0.09	0.08	0.00	0.00	0.00	0.00	0.00	0.00
15 9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
16 8	0.00	-0.11	-0.02	0.00	0.00	0.00	0.00	0.00	0.00
17 8	0.03	-0.06	-0.11	0.00	0.00	0.01	0.00	0.00	0.00

$SO_3CF_3^-$ (C_{3v})

	1			2			3		
	A2			E			E		
Frequencies --	60.8427			189.1725			189.1738		
Red. masses --	17.4403			17.2383			17.2383		
Frc consts --	0.0380			0.3635			0.3635		
IR Inten --	0.0000			0.8651			0.8654		
Raman Activ --	0.0000			0.0542			0.0542		
Depolar (P) --	0.7485			0.7500			0.7500		
Depolar (U) --	0.8562			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.00	0.01	0.09	0.00	0.09	-0.01	0.00
2 6	0.00	0.00	0.00	0.01	0.13	0.00	0.13	-0.01	0.00
3 8	0.42	0.00	0.00	0.00	-0.05	0.62	-0.01	0.00	-0.04
4 8	-0.21	0.36	0.00	-0.02	-0.02	-0.34	-0.04	-0.02	-0.51
5 8	-0.21	-0.36	0.00	0.01	-0.02	-0.27	-0.04	0.02	0.56
6 9	-0.20	0.35	0.00	-0.02	-0.04	-0.28	-0.06	-0.01	-0.42
7 9	0.40	0.00	0.00	0.00	-0.07	0.51	-0.03	0.00	-0.03
8 9	-0.20	-0.35	0.00	0.01	-0.04	-0.22	-0.06	0.02	0.46

	4			5			6		
	A1			E			E		
Frequencies --	275.6141			329.3956			329.3964		
Red. masses --	18.1708			17.5903			17.5903		
Frc consts --	0.8133			1.1245			1.1245		
IR Inten --	0.1139			0.0534			0.0534		
Raman Activ --	6.2177			2.2748			2.2747		
Depolar (P) --	0.2413			0.7500			0.7500		
Depolar (U) --	0.3887			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	0.25	0.13	0.04	0.00	-0.04	0.13	0.00
2 6	0.00	0.00	-0.24	-0.20	-0.07	0.00	0.07	-0.20	0.00
3 8	0.00	-0.03	0.37	0.29	0.01	0.14	-0.10	0.04	0.43
4 8	0.03	0.01	0.37	0.07	-0.03	-0.44	-0.14	0.27	-0.09
5 8	-0.03	0.01	0.37	0.14	0.18	0.30	0.07	0.19	-0.33
6 9	-0.03	-0.02	-0.40	-0.08	0.02	0.47	0.14	-0.26	0.10
7 9	0.00	0.04	-0.40	-0.29	-0.02	-0.15	0.10	-0.06	-0.45
8 9	0.03	-0.02	-0.40	-0.15	-0.18	-0.32	-0.06	-0.20	0.36

	7			8			9		
	E			E			E		
Frequencies --	500.6294			500.6316			554.7164		
Red. masses --	17.7814			17.7814			18.1568		
Frc consts --	2.6257			2.6257			3.2918		
IR Inten --	12.8374			12.8382			8.1007		
Raman Activ --	0.2966			0.2968			2.4903		
Depolar (P) --	0.7500			0.7500			0.7500		
Depolar (U) --	0.8571			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.01	0.23	0.00	-0.23	-0.01	0.00	-0.01	0.23	0.00
2 6	-0.01	0.16	0.00	-0.16	-0.01	0.00	0.01	-0.29	0.00
3 8	0.02	0.28	-0.01	0.55	-0.01	0.00	0.01	0.26	0.11
4 8	0.36	-0.36	0.00	-0.09	-0.34	0.00	0.27	-0.22	-0.05
5 8	-0.36	-0.33	0.00	-0.05	0.37	0.00	-0.27	-0.20	-0.06
6 9	0.28	-0.23	0.01	-0.13	-0.28	-0.03	-0.35	0.19	0.07
7 9	0.02	0.29	-0.03	0.38	-0.01	0.00	-0.01	-0.44	-0.15
8 9	-0.29	-0.20	0.02	-0.11	0.30	0.02	0.36	0.17	0.08

	10			11			12		
	E			A1			A1		
Frequencies --	554.7198			615.9781			731.8947		
Red. masses --	18.1568			21.2789			18.3289		
Frc consts --	3.2918			4.7570			5.7847		
IR Inten --	8.1003			168.4253			4.6168		
Raman Activ --	2.4904			0.6164			10.0634		
Depolar (P) --	0.7500			0.0084			0.0020		
Depolar (U) --	0.8571			0.0166			0.0039		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	-0.23	-0.01	0.00	0.00	0.00	0.58	0.00	0.00	0.18
2 6	0.29	0.01	0.00	0.00	0.00	0.26	0.00	0.00	-0.38
3 8	0.36	-0.01	0.00	0.00	0.25	-0.34	0.00	0.08	-0.05
4 8	-0.11	-0.26	0.10	-0.21	-0.12	-0.34	-0.07	-0.04	-0.05
5 8	-0.09	0.27	-0.10	0.21	-0.12	-0.34	0.07	-0.04	-0.05
6 9	0.24	0.35	-0.13	-0.11	-0.06	-0.10	0.45	0.26	0.02
7 9	-0.39	0.01	0.00	0.00	0.13	-0.10	0.00	-0.52	0.02
8 9	0.22	-0.36	0.12	0.11	-0.06	-0.10	-0.45	0.26	0.02

	13			14			15		
	A1			E			E		
Frequencies --	997.2060			1111.1472			1111.1569		
Red. masses --	16.1042			13.2069			13.2069		
Frc consts --	9.4354			9.6071			9.6073		
IR Inten --	172.9309			166.8231			166.8166		
Raman Activ --	35.9795			2.6384			2.6376		
Depolar (P) --	0.0067			0.7500			0.7500		
Depolar (U) --	0.0133			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	-0.17	-0.07	0.00	0.00	0.00	-0.07	0.00
2 6	0.00	0.00	-0.34	0.91	0.02	0.00	-0.02	0.91	0.00
3 8	0.00	0.51	0.13	0.00	0.00	0.00	0.00	0.06	0.00
4 8	-0.44	-0.25	0.13	0.05	0.02	0.00	0.02	0.02	0.00
5 8	0.44	-0.25	0.13	0.04	-0.02	0.00	-0.03	0.02	0.00
6 9	-0.07	-0.04	0.06	-0.24	-0.10	0.10	-0.09	-0.12	0.06
7 9	0.00	0.08	0.06	-0.06	-0.01	0.00	0.00	-0.29	-0.11
8 9	0.07	-0.04	0.06	-0.23	0.10	-0.10	0.10	-0.12	0.06

	16			17			18		
	A1			E			E		
Frequencies --	1180.2235			1243.1479			1243.1484		
Red. masses --	13.7871			20.4157			20.4158		
Frc consts --	11.3150			18.5892			18.5893		
IR Inten --	75.5612			389.3124			389.2848		
Raman Activ --	8.2099			7.3492			7.3493		
Depolar (P) --	0.5955			0.7500			0.7500		
Depolar (U) --	0.7465			0.8571			0.8571		
Atom AN	X	Y	Z	X	Y	Z	X	Y	Z
1 16	0.00	0.00	-0.16	0.01	0.53	0.00	0.53	-0.01	0.00
2 6	0.00	0.00	0.87	0.00	0.15	0.00	0.15	0.00	0.00
3 8	0.00	0.14	0.06	0.00	-0.66	-0.15	-0.04	0.02	0.00
4 8	-0.12	-0.07	0.06	-0.28	-0.20	0.08	-0.50	-0.27	0.13
5 8	0.12	-0.07	0.06	0.26	-0.19	0.07	-0.51	0.27	-0.13
6 9	0.14	0.08	-0.14	-0.02	-0.02	0.02	-0.04	-0.02	0.03
7 9	0.00	-0.16	-0.14	0.00	-0.06	-0.03	-0.01	0.00	0.00
8 9	-0.14	0.08	-0.14	0.02	-0.02	0.01	-0.05	0.02	-0.03