

Harmonic vibrational frequencies of fluorene (C₁₃H₁₀) in the four charge states -1, 0, +1 and +2. All calculations were performed at the B3LYP/4-31g level of theory.

Numb. of the mode	Anion		Neutral		Cation		Dication	
	Freq. (cm ⁻¹)	Int. (km mol ⁻¹)	Freq. (cm ⁻¹)	Int. (km mol ⁻¹)	Freq. (cm ⁻¹)	Int. (km mol ⁻¹)	Freq. (cm ⁻¹)	Int. (km mol ⁻¹)
1	86	0.1	96	0.4	83	1.2	68	2.3
2	135	0.0	136	0.0	126	0.0	113	0.0
3	210	0.1	212	0.2	215	0.4	210	8.4
4	218	7.7	241	6.8	228	7.6	213	0.0
5	251	0.0	272	0.0	245	0.0	217	0.9
6	374	3.4	410	0.4	390	2.4	330	1.0
7	408	0.2	418	5.0	414	0.9	392	0.0
8	431	0.0	432	0.0	434	8.9	397	20.9
9	451	0.1	473	1.7	440	0.0	411	3.2
10	484	0.3	489	0.3	493	0.0	450	0.0
11	521	0.0	547	0.1	494	0.0	484	0.1
12	533	3.6	568	0.0	521	0.2	502	1.7
13	606	0.0	632	7.1	612	34.5	589	27.6
14	620	0.1	638	0.3	620	1.3	606	7.9
15	621	79.5	704	3.1	657	14.4	610	18.2
16	630	0.0	731	0.0	713	0.0	693	1.5
17	657	1.4	739	0.0	722	0.2	696	0.0
18	695	0.0	744	108.1	761	111.2	765	21.9
19	710	0.5	785	0.0	780	5.2	772	111.1
20	734	29.2	793	0.4	806	0.0	818	0.8
21	753	0.0	838	0.2	831	0.0	822	0.0
22	778	56.3	861	1.2	858	0.0	856	2.5
23	816	3.0	872	0.0	879	0.0	893	0.0
24	826	3.4	921	0.0	945	1.6	950	200.1
25	839	0.0	938	0.0	973	0.0	964	3.6
26	902	0.0	965	5.5	978	92.4	964	8.5
27	904	0.0	982	0.0	985	7.8	965	0.7
28	952	2.7	984	0.2	994	0.5	1002	0.0
29	969	165.1	1004	3.2	1006	1.3	1006	5.0
30	987	0.0	1019	0.5	1012	0.0	1037	0.0
31	1004	11.4	1033	1.6	1014	3.7	1038	13.1
32	1062	4.6	1096	1.6	1101	9.2	1075	6.7
33	1067	0.5	1105	0.6	1101	2.7	1081	2.4
34	1108	15.5	1141	0.0	1151	62.1	1140	71.3
35	1120	115.2	1164	0.2	1159	0.0	1141	52.3
36	1126	0.0	1170	0.0	1161	16.4	1167	20.6
37	1142	0.4	1180	2.8	1176	3.1	1169	3.0
38	1146	3.1	1183	1.0	1177	7.1	1171	0.0
39	1193	5.6	1198	1.6	1215	0.1	1232	0.4
40	1208	10.5	1222	4.1	1238	0.8	1240	0.0
41	1286	4.8	1299	0.0	1316	0.1	1302	0.0
42	1307	52.6	1306	5.4	1332	6.5	1343	2.6
43	1323	5.1	1316	2.3	1347	0.6	1351	0.2
44	1333	15.3	1349	0.4	1378	7.3	1384	19.2
45	1372	13.1	1434	15.5	1405	0.6	1394	16.7
46	1406	2.4	1450	2.6	1407	59.1	1413	56.0
47	1448	7.1	1454	21.9	1442	0.7	1414	138.0
48	1448	0.0	1472	0.7	1449	42.8	1432	5.6
49	1453	0.1	1476	7.3	1473	12.2	1494	37.1
50	1469	63.7	1570	0.0	1496	17.3	1507	17.5
51	1519	0.6	1572	1.5	1523	19.0	1532	103.9
52	1566	364.5	1598	0.1	1560	434.8	1585	630.1

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Numb. of the mode	Anion		Neutral		Cation		Dication	
	Freq. (cm^{-1})	Int. (km mol^{-1})	Freq. (cm^{-1})	Int. (km mol^{-1})	Freq. (cm^{-1})	Int. (km mol^{-1})	Freq. (cm^{-1})	Int. (km mol^{-1})
53	1604	0.2	1599	2.4	1602	0.0	1627	0.0
54	2844	95.4	2902	15.1	2923	0.3	2916	27.1
55	2860	60.1	2930	14.6	2955	0.0	2949	10.6
56	2979	90.9	3044	2.9	3083	0.0	3081	20.6
57	2980	19.6	3045	7.5	3083	0.1	3081	0.2
58	2987	0.3	3050	4.4	3087	0.4	3096	8.7
59	2987	142.0	3052	6.7	3090	0.0	3100	2.1
60	3018	2.2	3062	10.2	3096	0.9	3101	12.2
61	3022	140.0	3063	58.8	3096	0.7	3102	20.5
62	3037	216.0	3077	73.4	3107	5.1	3112	19.2
63	3039	6.0	3078	7.6	3108	0.3	3113	18.2