**Table S7.** The Huang-Rhys Factors, and intramolecular reorganization energies, λi (eV) for each vibrational frequency, ωi (cm-1) of acetophenone-d8 in its neutral and anionic states.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Neutral |  |  |  | Anion |  |  |  |
| ωi |  | λi |  |  | ωi |  | λi |  |
| 203 | 0.037  | 0.001 |  |  | 192 | 0.041  | 0.001 |  |
| 346 | 0.034  | 0.001 |  |  | 335 | 0.051  | 0.002 |  |
| 448 | 0.145  | 0.008 |  |  | 450 | 0.159  | 0.009 |  |
| 707 | 0.006  | 0.001 |  |  | 689 | 0.000  | 0 |  |
| 837 | 0.264  | 0.027 |  |  | 811 | 0.210  | 0.021 |  |
| 854 | 0.003  | 0 |  |  | 832 | 0.006  | 0.001 |  |
| 867 | 0.030  | 0.003 |  |  | 852 | 0.006  | 0.001 |  |
| 904 | 0.020  | 0.002 |  |  | 884 | 0.063  | 0.007 |  |
| 990 | 0.092  | 0.011 |  |  | 966 | 0.079  | 0.009 |  |
| 1022 | 0.000  | 0 |  |  | 997 | 0.007  | 0.001 |  |
| 1089 | 0.000  | 0 |  |  | 1075 | 0.008  | 0.001 |  |
| 1091 | 0.012  | 0.002 |  |  | 1103 | 0.002  | 0 |  |
| 1132 | 0.019  | 0.003 |  |  | 1111 | 0.006  | 0.001 |  |
| 1262 | 0.095  | 0.015 |  |  | 1249 | 0.006  | 0.001 |  |
| 1370 | 0.022  | 0.004 |  |  | 1313 | 0.027  | 0.004 |  |
| 1377 | 0.003  | 0.001 |  |  | 1387 | 0.004  | 0.001 |  |
| 1423 | 0.114  | 0.02 |  |  | 1425 | 0.012  | 0.002 |  |
| 1596 | 0.046  | 0.009 |  |  | 1463 | 0.037  | 0.007 |  |
| 1622 | 0.293  | 0.059 |  |  | 1521 | 0.290  | 0.055 |  |
| 1680 | 0.268  | 0.056 |  |  | 1618 | 0.450  | 0.09 |  |
| 2193 | 0.005  | 0.001 |  |  | 2132 | 0.006  | 0.001 |  |
| 2350 | 0.000  | 0 |  |  | 2297 | 0.003  | 0.001 |  |
| 2356 | 0.003  | 0.001 |  |  | 2302 | 0.000  | 0 |  |