**Table 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Beam | vp (ms-1) | S | Ec (kJ mol-1) | ΘCM |
| CH3CHCH2 | 833 ± 15 | 11.0 ± 0.3 |  |  |
| C2 | 1440 ± 32 | 2.7 ± 0.7 | 21.1± 0.8 | 45.4± 1.1 |
| CH3CDCD2 | 815 ± 20 | 7.8 ± 1.0 | 21.4± 0.9 | 46.7± 1.2 |
| CD3CHCH2 | 815 ± 20 | 7.8 ± 1.0 | 21.4± 0.9 | 46.7± 1.2 |

**Table 2**

(a) C2(1Σg+)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Collision Energy | 0.0 | 8.4 | 16.7 | 21.0 | 25.1 | 33.5 | 41.8 |
| C5H5 + H |  |  |  |  |  |  |  |
| CH2CCCHCH2 **p1** total | 44.96 | 44.98 | 44.98 | 44.83 | 44.71 | 44.42 | 44.19 |
| **p1** from **s2** | 41.20 | 41.33 | 41.41 | 41.31 | 41.22 | 41.01 | 40.89 |
| **p1** from **s8** | 1.35 | 1.38 | 1.41 | 1.43 | 1.45 | 1.48 | 1.46 |
| **p1** from **s6a** | 2.41 | 2.28 | 2.15 | 2.09 | 2.05 | 1.94 | 1.83 |
| *t*-CHCCHCHCH2 **p2** total | 13.51 | 13.08 | 12.66 | 12.48 | 12.32 | 12.03 | 11.57 |
| **p2** from **s8** | 8.15 | 8.09 | 8.01 | 7.97 | 7.96 | 7.90 | 7.79 |
| **p2** from **s6** | 5.36 | 5.00 | 4.65 | 4.51 | 4.36 | 4.14 | 3.78 |
| CH2CCCCH3 **p3** | 1.46 | 1.61 | 1.76 | 1.85 | 1.91 | 2.05 | 2.20 |
| c-C5H5 **p5** | 7.04 | 6.41 | 5.85 | 5.57 | 5.37 | 4.95 | 4.71 |
| CHCCCHCH3 **p6** | 1.00 | 1.13 | 1.26 | 1.35 | 1.41 | 1.57 | 1.74 |
| C4H3 + CH3 |  |  |  |  |  |  |  |
| *i*-C4H3 total | 27.07 | 27.70 | 28.29 | 28.66 | 28.95 | 29.60 | 30.27 |
| *i*-C4H3 from **s2** | 26.48 | 27.14 | 27.75 | 28.14 | 28.44 | 29.10 | 29.80 |
| *i*-C4H3 from **s7** | 0.59 | 0.56 | 0.54 | 0.53 | 0.52 | 0.50 | 0.46 |
| *n*-C4H3 | 1.17 | 1.28 | 1.39 | 1.44 | 1.46 | 1.49 | 1.46 |
| CH3CCH + CCH2 | 2.85 | 2.80 | 2.75 | 2.73 | 2.72 | 2.68 | 2.64 |
| CH3CCH + C2H2 | 0.73 | 0.77 | 0.80 | 0.83 | 0.84 | 0.89 | 0.89 |
| CH3CHCCC + H2 | 0.12 | 0.14 | 0.16 | 0.16 | 0.17 | 0.19 | 0.22 |
| CH3CCCCH + H2 | 0.09 | 0.09 | 0.10 | 0.10 | 0.10 | 0.11 | 0.11 |
| C4H2 + CH4 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

(b) C2(3Πu)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Collision Energy | 0.0 | | 8.4 | | 16.7 | | 21.0 | | 25.1 | | 33.5 | | 41.8 | |
| From initial adduct | **i1** | **i2** | **i1** | **i2** | **i1** | **i2** | **i1** | **i2** | **i1** | **i2** | **i1** | **i2** | **i1** | **i2** |
| C5H5 + H |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| CH2CCCHCH2 **p1** | 23.64 | 21.62 | 24.14 | 21.86 | 24.39 | 21.87 | 24.51 | 21.87 | 24.59 | 21.83 | 24.66 | 21.69 | 24.73 | 21.55 |
| *t*-CHCCHCHCH2 **p2** | 2.53 | 2.68 | 2.84 | 3.04 | 3.10 | 3.36 | 3.23 | 3.52 | 3.34 | 3.66 | 3.56 | 3.96 | 3.76 | 4.22 |
| *c*-CHCCHCHCH2 **p2’** total | 26.73 | 28.29 | 28.39 | 30.39 | 29.74 | 32.21 | 30.31 | 33.03 | 30.77 | 33.73 | 31.53 | 34.99 | 32.05 | 36.02 |
| **p2’** from **i9** | 25.29 | 26.77 | 26.79 | 28.67 | 27.97 | 30.29 | 28.47 | 31.02 | 28.85 | 31.63 | 29.49 | 32.73 | 29.90 | 33.60 |
| **p2’** from **i11** | 1.43 | 1.52 | 1.60 | 1.72 | 1.77 | 1.91 | 1.84 | 2.01 | 1.92 | 2.10 | 2.04 | 2.27 | 2.16 | 2.42 |
| CH2CCCCH3 **p3** | 1.05 | 0.96 | 1.18 | 1.07 | 1.31 | 1.18 | 1.38 | 1.23 | 1.45 | 1.28 | 1.58 | 1.39 | 1.71 | 1.49 |
| c-C5H5 **p5** | 30.10 | 31.85 | 26.05 | 27.88 | 22.64 | 24.52 | 21.06 | 22.95 | 19.71 | 21.61 | 17.20 | 19.09 | 15.10 | 16.97 |
| CHCCCHCH3 **p6** | 1.31 | 1.20 | 1.51 | 1.37 | 1.73 | 1.55 | 1.84 | 1.64 | 1.95 | 1.73 | 2.24 | 1.97 | 2.40 | 2.09 |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| *i*-C4H3 + CH3 | 14.64 | 13.40 | 15.89 | 14.39 | 17.08 | 15.31 | 17.66 | 15.76 | 18.20 | 16.16 | 19.22 | 16.91 | 20.25 | 17.65 |



Figure 1

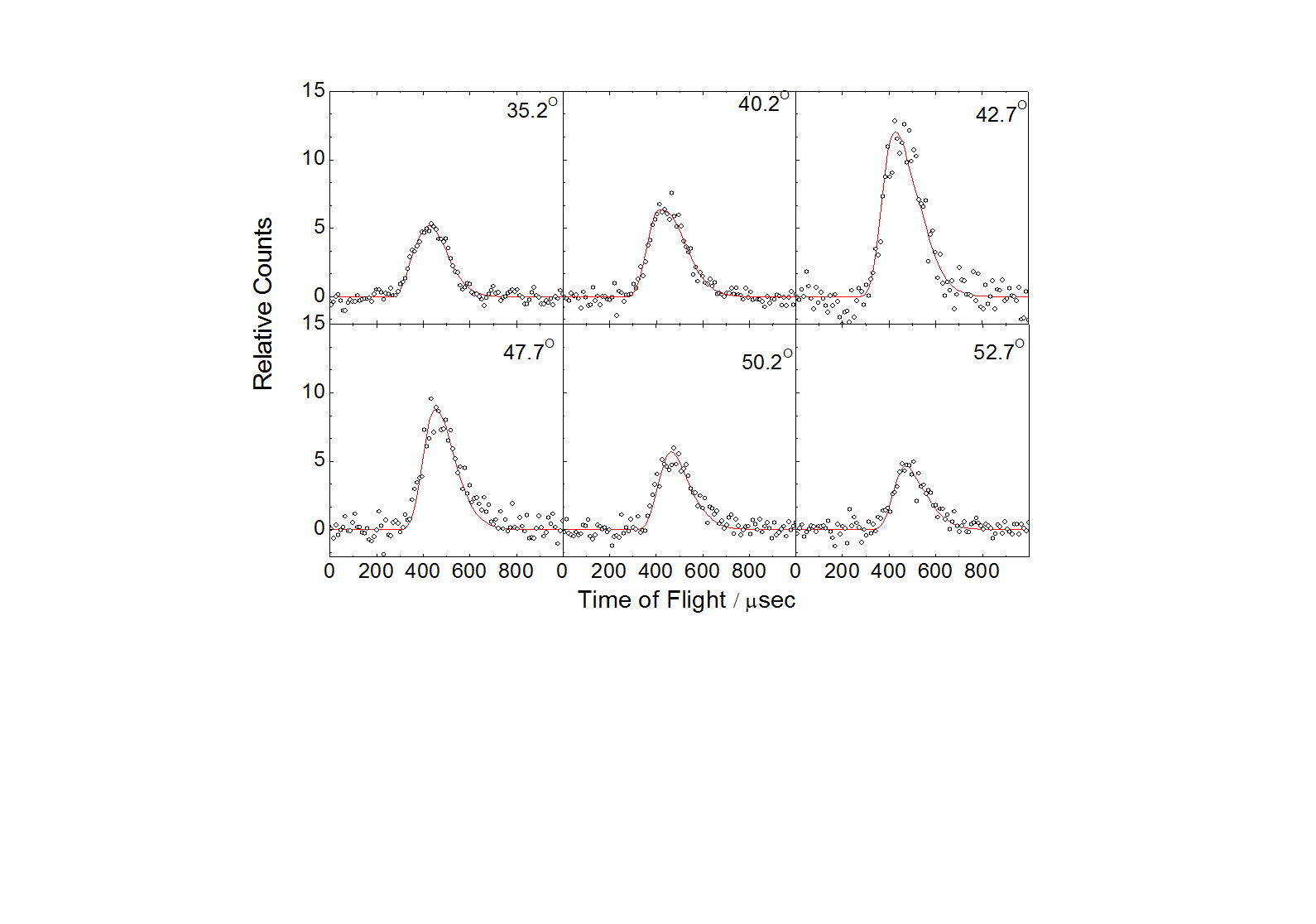
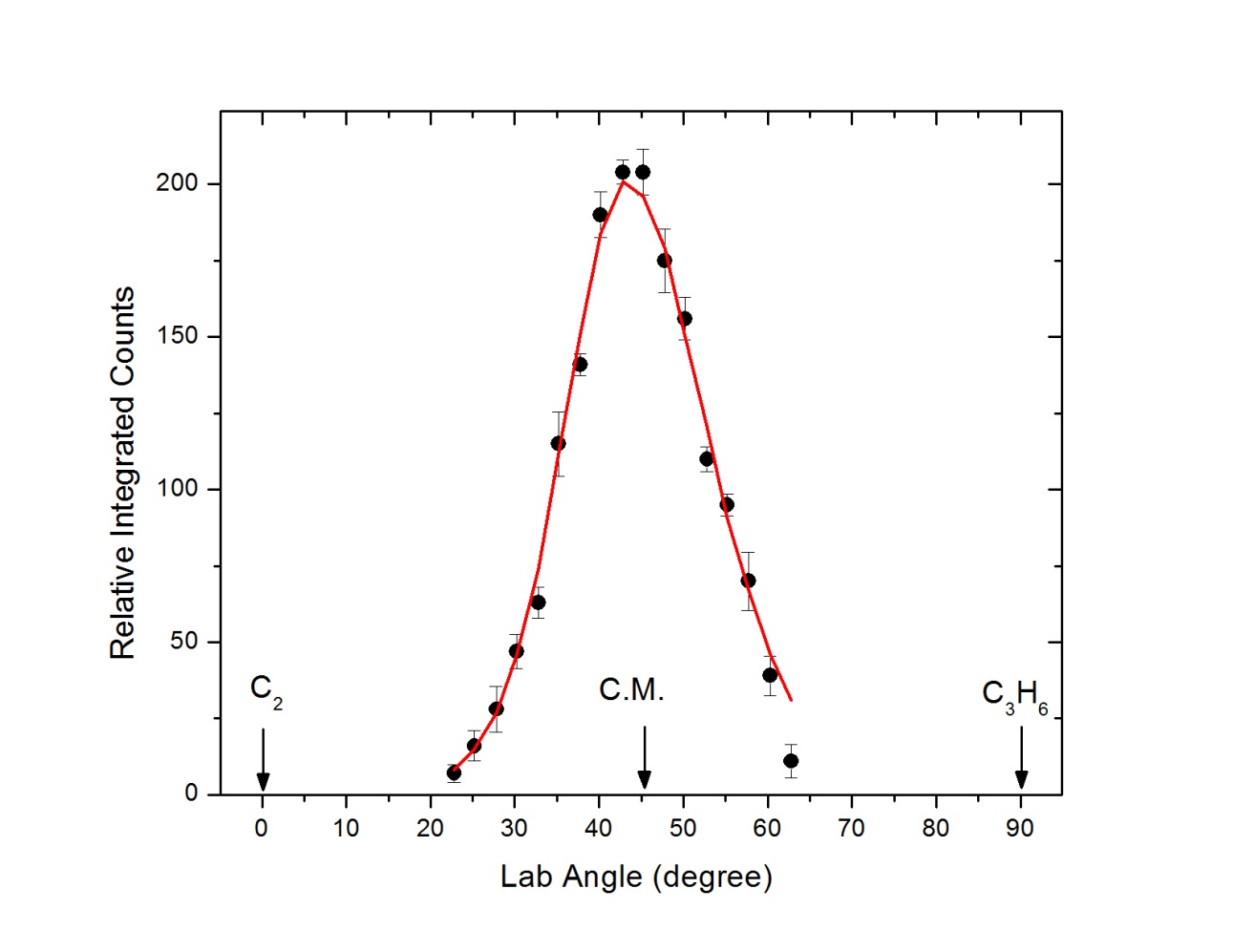


Figure 2



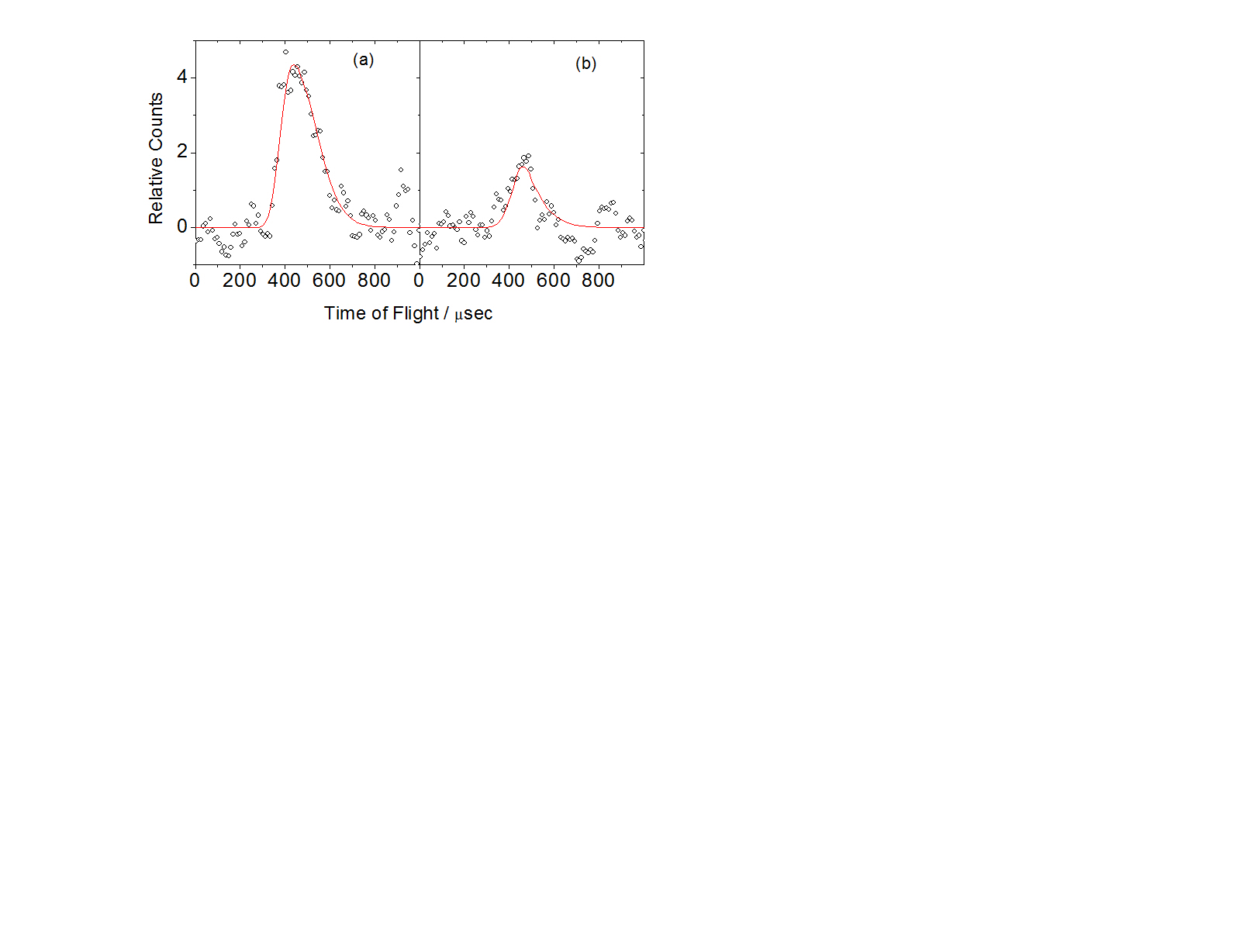
Figure 3

Figure 4

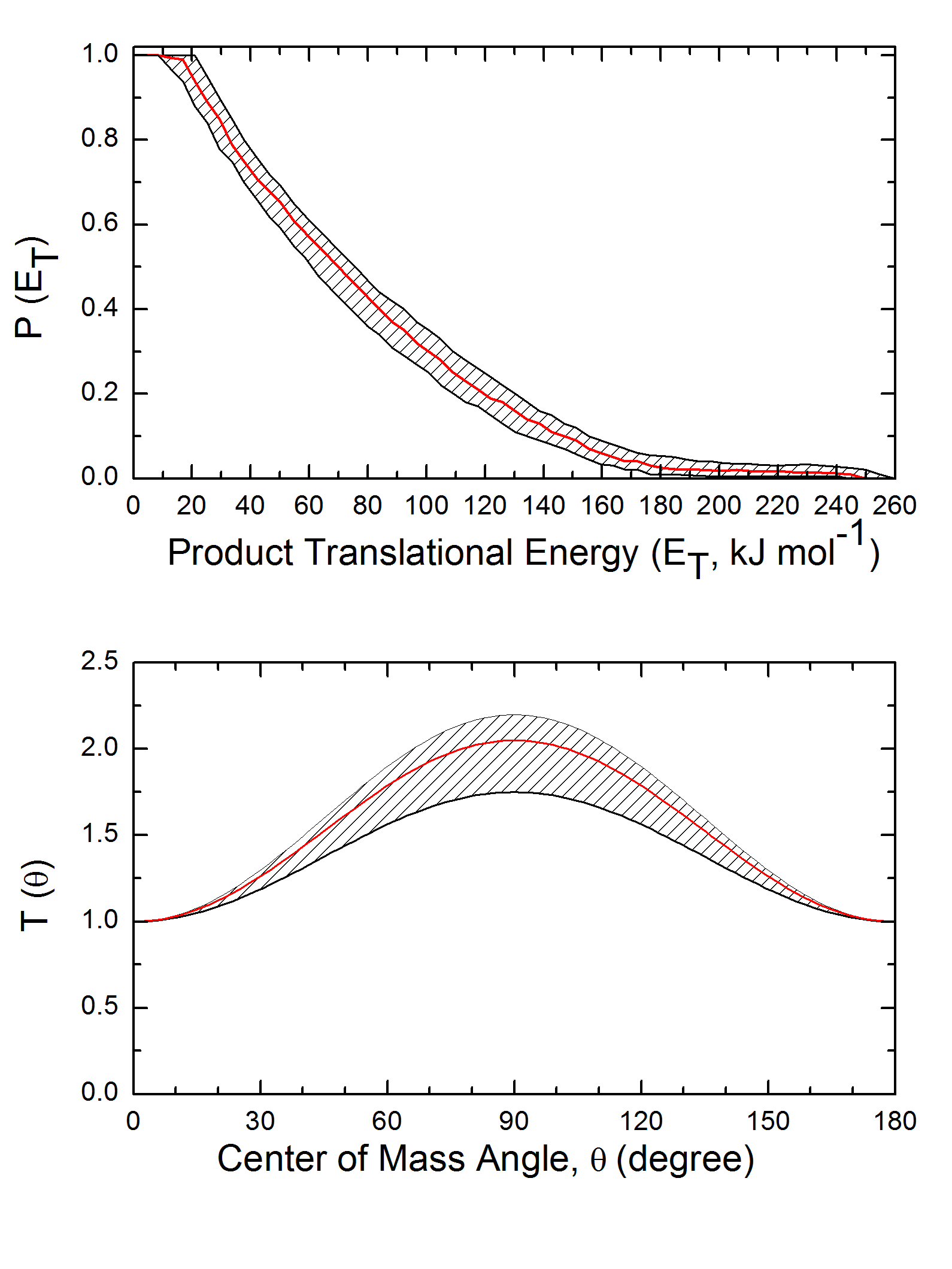


Figure 5

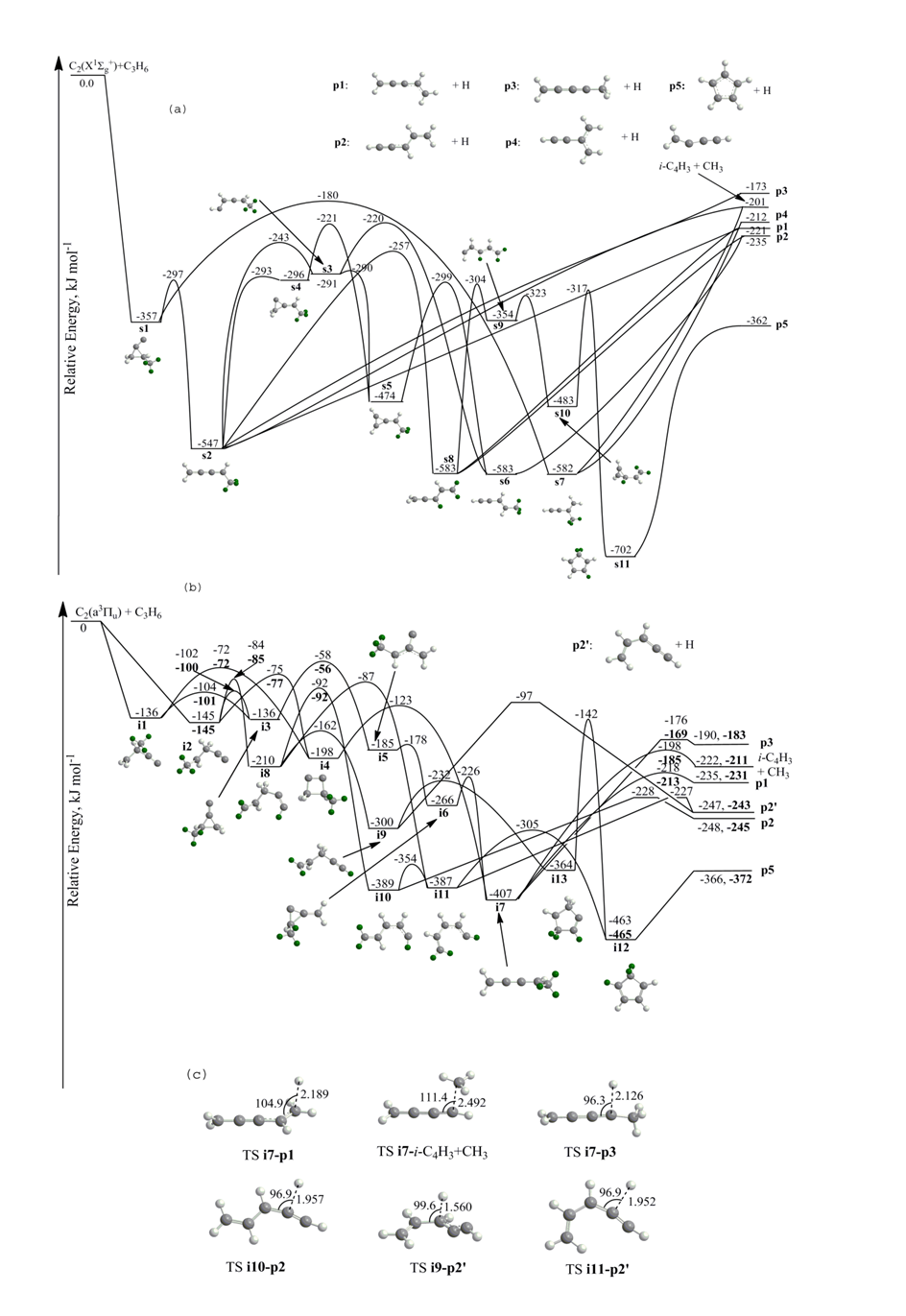


Figure 6