

Seeking for accurate scattering parameters of the HCO⁺ and He collisional system: a new efficient computational potential energy surface.

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SUPPLEMENTARY MATERIAL

TABLE I. Integrated rate coefficients $j \rightarrow j'$ from 5 to 50 K. Units are $10^{-10} \text{ cm}^3 \text{ s}^{-1}$.

| $j \rightarrow j'$ | Temperature / K | | | | | | | | | |
|--------------------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 |
| 1 → 0 | 1.368 | 1.188 | 1.104 | 1.056 | 1.026 | 1.006 | 0.992 | 0.983 | 0.977 | 0.972 |
| 2 → 0 | 0.687 | 0.625 | 0.577 | 0.542 | 0.516 | 0.495 | 0.477 | 0.462 | 0.448 | 0.436 |
| 2 → 1 | 1.670 | 1.641 | 1.594 | 1.556 | 1.527 | 1.504 | 1.487 | 1.473 | 1.463 | 1.456 |
| 3 → 0 | 0.278 | 0.277 | 0.266 | 0.254 | 0.243 | 0.234 | 0.226 | 0.220 | 0.215 | 0.210 |
| 3 → 1 | 1.030 | 1.002 | 0.966 | 0.929 | 0.895 | 0.865 | 0.838 | 0.814 | 0.792 | 0.773 |
| 3 → 2 | 1.683 | 1.659 | 1.635 | 1.618 | 1.606 | 1.598 | 1.593 | 1.591 | 1.592 | 1.594 |
| 4 → 0 | 0.185 | 0.177 | 0.169 | 0.162 | 0.155 | 0.150 | 0.145 | 0.140 | 0.137 | 0.133 |
| 4 → 1 | 0.466 | 0.475 | 0.479 | 0.479 | 0.477 | 0.475 | 0.474 | 0.472 | 0.471 | 0.471 |
| 4 → 2 | 1.177 | 1.161 | 1.128 | 1.095 | 1.065 | 1.039 | 1.015 | 0.993 | 0.973 | 0.955 |
| 4 → 3 | 1.711 | 1.680 | 1.648 | 1.628 | 1.616 | 1.610 | 1.609 | 1.609 | 1.612 | 1.617 |
| 5 → 0 | 0.146 | 0.139 | 0.138 | 0.138 | 0.139 | 0.140 | 0.141 | 0.141 | 0.142 | 0.142 |
| 5 → 1 | 0.412 | 0.388 | 0.373 | 0.364 | 0.356 | 0.350 | 0.344 | 0.338 | 0.333 | 0.328 |
| 5 → 2 | 0.675 | 0.665 | 0.660 | 0.658 | 0.657 | 0.656 | 0.654 | 0.653 | 0.652 | 0.650 |
| 5 → 3 | 1.122 | 1.143 | 1.139 | 1.125 | 1.109 | 1.091 | 1.073 | 1.055 | 1.039 | 1.023 |
| 5 → 4 | 1.767 | 1.714 | 1.653 | 1.608 | 1.579 | 1.561 | 1.550 | 1.546 | 1.545 | 1.547 |

TABLE II. Integrated rate coefficients $j \rightarrow j'$ from 60 to 100 K. Units are $10^{-10} \text{ cm}^3 \text{ s}^{-1}$.

| $j \rightarrow j'$ | Temperature / K | | | | |
|--------------------|-----------------|-------|-------|-------|-------|
| | 60 | 70 | 80 | 90 | 100 |
| 1 → 0 | 0.968 | 0.967 | 0.967 | 0.968 | 0.969 |
| 2 → 0 | 0.416 | 0.398 | 0.384 | 0.372 | 0.362 |
| 2 → 1 | 1.446 | 1.443 | 1.443 | 1.446 | 1.450 |
| 3 → 0 | 0.204 | 0.200 | 0.198 | 0.197 | 0.197 |
| 3 → 1 | 0.740 | 0.714 | 0.693 | 0.676 | 0.661 |
| 3 → 2 | 1.601 | 1.612 | 1.624 | 1.637 | 1.650 |
| 4 → 0 | 0.128 | 0.124 | 0.122 | 0.120 | 0.118 |
| 4 → 1 | 0.471 | 0.473 | 0.476 | 0.478 | 0.481 |
| 4 → 2 | 0.924 | 0.898 | 0.877 | 0.858 | 0.842 |
| 4 → 3 | 1.628 | 1.642 | 1.657 | 1.672 | 1.686 |
| 5 → 0 | 0.143 | 0.143 | 0.143 | 0.143 | 0.143 |
| 5 → 1 | 0.320 | 0.313 | 0.307 | 0.302 | 0.297 |
| 5 → 2 | 0.648 | 0.647 | 0.646 | 0.645 | 0.644 |
| 5 → 3 | 0.994 | 0.969 | 0.948 | 0.929 | 0.913 |
| 5 → 4 | 1.556 | 1.569 | 1.585 | 1.601 | 1.617 |