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Supporting Information for

Vibrationally Energy Pooling via Collisions between Asymmetric Stretching Excited CO_2: A Quasi-Classical Trajectory Study on An Accurate Full-dimensional Potential Energy Surface

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Figure S1. The relationship between impact parameters and the changes in the asymmetric stretch vibrational quantum number for v_{as} = 7.4 in the initial reactant CO_2 and collision energy at 0.393 kcal/mol.

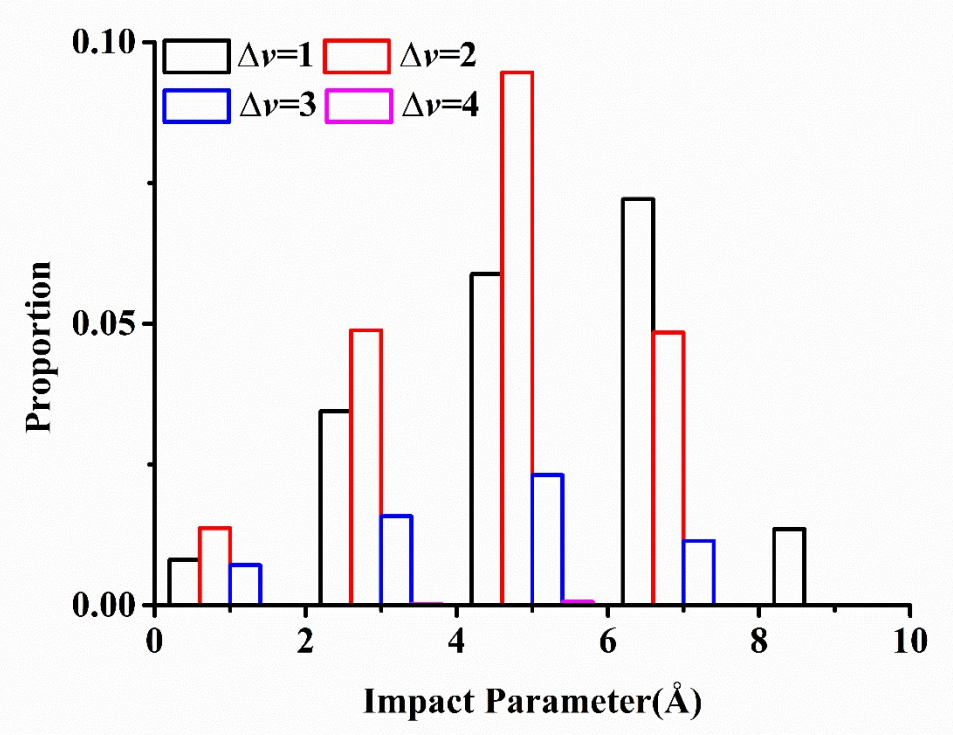


Figure S2. Comparison of the calculated potential energy curves along a C-O distance of CO_2 at different levels of ab initio theory.

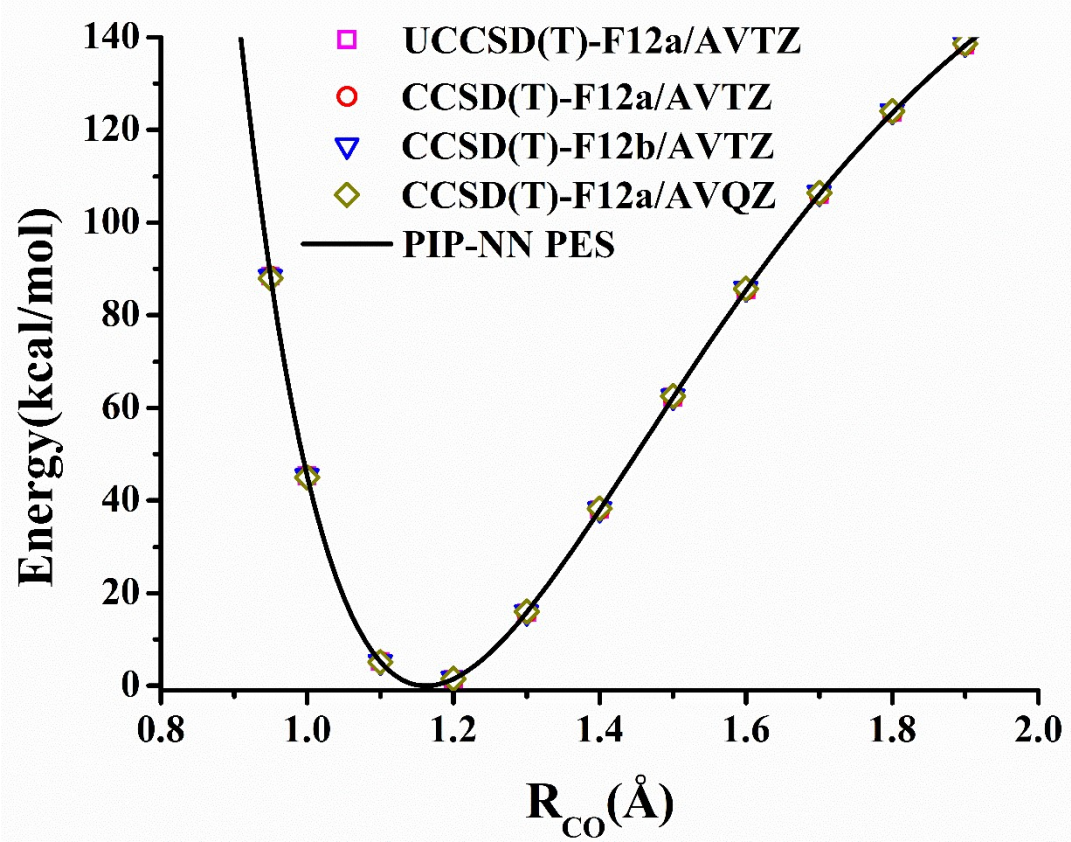


Figure S3. The evolution of the asymmetric stretching, symmetric stretching, and bending coordinates as a function time for an exemplary trajectory for CO_2 (v_{as}=7.4)+CO_2 (v_{as}=7.4) → CO_2(v_{as}=5.4)+CO_2(v_{as}=9.4) at the collision energy of 0.393 kcal/mol.

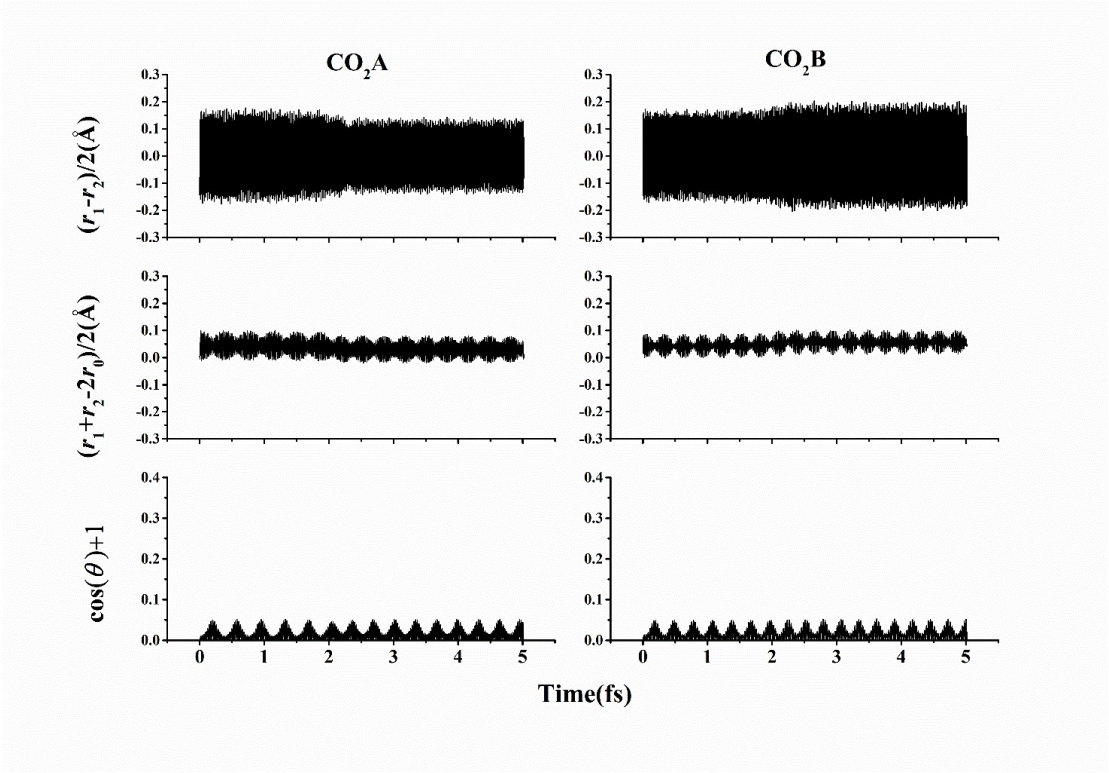
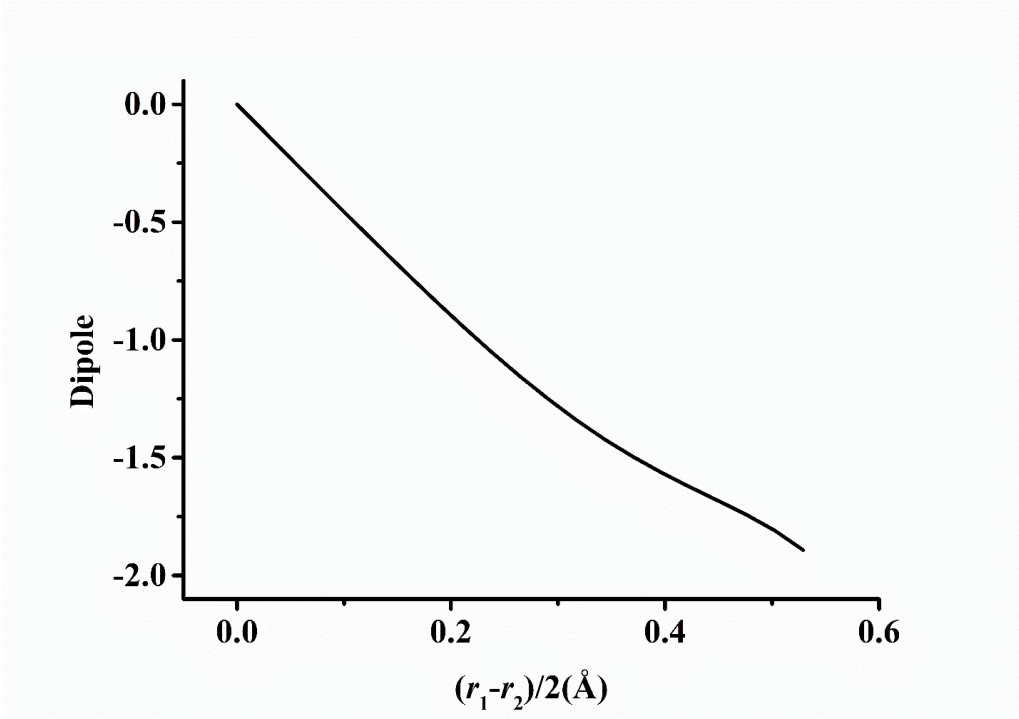


Figure S4. The dipole of CO_2 as a function of $(r_1-r_2)/2$ using the dipole moment surface reported in ref. [1], where $r_1+r_2= 2r_{eq}$. ∠OCO=180°.



Ref.

1. X. Huang, D. W. Schwenke, S. A. Tashkun and T. J. Lee, *J. Chem. Phys.*, 2012, **136**, 124311.