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## **Electronic Supplementary Information**

## Quantum dynamics analysis of transition-state spectrum for the SH + $H_2S \rightarrow H_2S + SH$ reaction.

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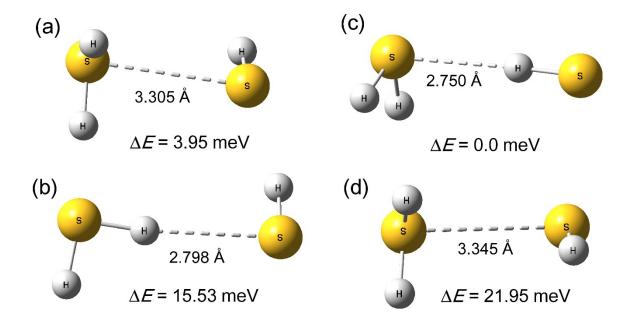


Fig. S1 Molecular structures of the SH $\cdots$ H<sub>2</sub>S complex optimized at the MP2/aug-cc-pVDZ level of theory. Relative energies are also shown.

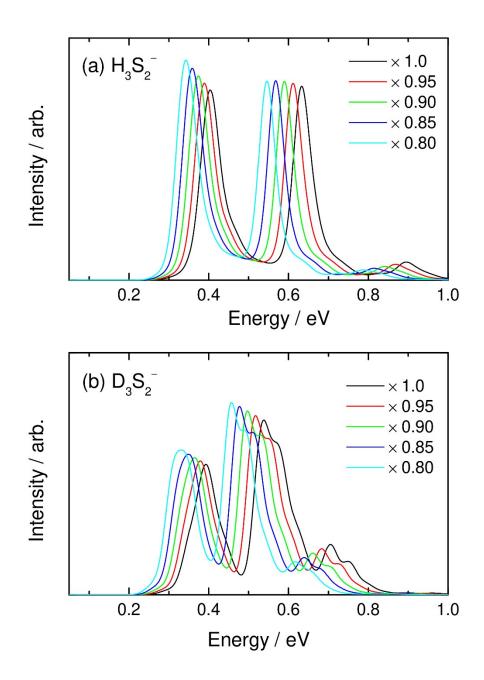


Fig. S2 Effect of a scale factor (0.80–1.0) on the calculated photodetachment spectra of the (a)  $H_3S_2^-$  and (b)  $D_3S_2^-$  anions. The neural MP2 potential energy surface is used for scaling. Energy is measured from the asymptotic SH +  $H_2S$  potential energy minimum.