

HS-H BOND DISSOCIATION ENERGY DETERMINATION BY THRESHOLD ION-PAIR PRODUCTION SPECTROSCOPY (TIPPS)

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The first single photon threshold ion-pair production spectrum (TIPPS) of a polyatomic molecule, H_2S , was recorded by monitoring H^+ ion generated from the dissociation process $\text{H}_2\text{S} \rightarrow \text{HS}^- + \text{H}^+$. Its ion-pair threshold was determined to be $\text{IPP} = 122458 \pm 3 \text{ cm}^{-1}$. As a result, the bond dissociation energy ($\text{D}(\text{HS-H}) = 31451 \pm 4 \text{ cm}^{-1}$) could be calculated from $\text{D}(\text{HS-H}) = \text{IPP} - \text{IP}(\text{H}) + \text{EA}(\text{HS})$, by knowing the ionization potential of the hydrogen atom ($\text{IP}(\text{H}) = 109678.772 \text{ cm}^{-1}$) and the electron affinity of the HS radical ($\text{EA}(\text{HS}) = 18672 \pm 2 \text{ cm}^{-1}$).