It has already been demonstrated that the method of threshold ion-pair production spectroscopy (TIPPS) can be used to probe the energetics of molecular dissociation with spectroscopic accuracy. Since TIPPS produces a spectrum which measures energy differences between the starting neutral molecule states and the states of the ion-pair dissociation products, it can also be used to determine the spectroscopy of the ion fragments, and the dynamics of the ion-pair dissociation. The results of TIPPS experiments on the following dissociations will be used to illustrate these features of TIPPS:

\[
\begin{align*}
  & H_2S + h\nu \rightarrow H^+ + SH^- \\
  & H_2S + h\nu \rightarrow H^- + SH^+ \\
  & HCN + h\nu \rightarrow H^+ + CN^- 
\end{align*}
\]

Our results on these systems indicate that, as with neutral photodissociation, an initial state of the neutral can be coupled to a wide range of product states, meaning that the spectroscopy of highly excited ions can be studied by TIPPS.