

# Reactions in the gas phase probed by infrared spectroscopy – analytical and astrophysical implications

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Infrared (IR) spectroscopy provides detailed information on the molecular structures of complexes. This presentation will discuss the application of IR spectroscopy to study gas-phase fragmentation reactions in areas as disparate as the interstellar medium (ISM) and peptides trapped in mass spectrometers.

While mass spectrometry is typically employed to confirm the amino acid sequences of peptides, in some cases re-arrangement processes can take place that appear to permute/scramble the original primary structure. Vibrational spectroscopy is one of the most powerful tools to confirm the chemical structures of isomeric species and hence validate the underlying chemistry.

In the ISM, photodissociation of polyaromatic hydrocarbons (PAHs) has been proposed to play an important role in the formation of molecular hydrogen. In laboratory experiments, we can determine the rates of these processes in astrochemically relevant conditions, and rationalize the mechanisms with computational approaches.