

## **Infrared spectroscopy of molecular ions in helium droplets**

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Molecular ions are important intermediates in the chemistry of condensed phase and upper atmosphere as well as in astrochemistry. Therefore, great strides were done in developing new techniques for spectroscopy of ions. We show that the electron impact ionization of the helium droplets doped with molecules yields diverse molecular ions or ionic clusters embedded in the droplets of few thousand He atoms. Infrared spectra are obtained using release of the cations from the droplets upon laser excitation, followed by mass spectrometric detection. This experimental approach enables the study a wide range of ionic molecular species. Some topics highlighted in this talk will include:

- Rotation of small molecular ions in He droplets,
- Isomers of carbo-cations,
- Structure of radical cation clusters,
- Ion molecule reactions and protonation at low temperature.