

Abstract Submitted
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Trapped ion-molecule reactions of sympathetically cooled $C_2H_2^+$ and CCl^+ with nitriles OLIVIA KROHN, KATHERINE CATANI, JAMES GREENBERG, HEATHER LEWANDOWSKI, JILA and the Department of Physics at the University of Colorado, Boulder — Cold ion-molecule reactions in the laboratory allow for detailed investigations of collision dynamics and reactions relevant to the chemical evolution of the Interstellar Medium (ISM). Our experimental system uses trapped laser-cooled atomic ions to sympathetically cool molecular ions important in ISM chemistry. Product ions from reactions with neutral organic species are monitored as a function of reaction time using a time-of-flight mass spectrometer. Two systems ($C_2H_2^+$ and CCl^+ with CH_3CN) were studied for their potential contributions to our understanding of chemistry in the ISM and planetary atmospheres. Isotopologue substitutions and quantum chemical calculations aid in interpretation of experimental data. The branching ratios and rate constants of these systems provide insight into the mechanisms of bonding and behavior of the functional groups included in each reaction — particularly the activity of the CN bond.

Olivia Krohn
University of Colorado, Boulder

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