Collisional Properties of Dipole-Bound Negative Ions\textsuperscript{1} Y. LIU, M.
CANNON, L. SUESS, F.B. DUNNING — A Penning ion trap is being used to
study low-energy collisions between dipole-bound CH\textsubscript{3}CN\textsuperscript{−} ions and a variety of
attaching targets and polar molecules. In dipole bound negative ions the extra
electron is weakly bound by the dipole potential of the neutral molecule in a diffuse
orbital localized near the positive end of the dipole. In consequence, it is reasonable
to expect that such species will be quite reactive. Charge transfer is observed in
collisions with CH\textsubscript{3}NO\textsubscript{2} and CS\textsubscript{2} leading to the formation of long-lived ($\tau \sim 1$ ms)
CH\textsubscript{3}NO\textsuperscript{−} and CS\textsubscript{2} ions. Destruction is seen in collisions with polar targets as a
result of rotational energy transfer. The measured reaction rates are large ($\sim 10^{-7}$
cm\textsuperscript{3} s\textsuperscript{−1}) and different reaction models are being explored. The data demonstrate the
rich variety of processes that can occur in collisions involving dipole-bound anions.

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