

## INFRARED PHOTODISSOCIATION SPECTROSCOPY OF FIRST ROW TRANSITION METAL-CARBONYL CATIONS

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Transition metal-carbonyl cations are generated in a laser vaporization/supersonic expansion cluster source, mass selected and studied using infrared laser photodissociation spectroscopy. The carbonyl stretching region ( $2050\text{-}2350\text{ cm}^{-1}$ ) is probed using a tunable infrared OPO/OPA system. Several cluster sizes are investigated and insight into their stability and geometry is obtained.  $\text{Cu}(\text{CO})_4^+$  has a complete coordination sphere, consistent with 18-electron stability and a tetrahedral structure similar to that of isovalent  $\text{Ni}(\text{CO})_4$ .  $\text{Ti}(\text{CO})_6^+$  has a complete coordination sphere and does not satisfy the 18-electron rule. DFT calculations are performed and reported to corroborate the experimental data.