

## EXPERIMENTAL DETERMINATION OF THE BINDING ENERGIES OF THE T-SHAPED AND LINEAR ISOMERS OF THE $\text{Ne} \cdots \text{ICl}(X, v''=0)$ VAN DER WAALS COMPLEX

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Multiple features associated with transitions of the near T-shaped and linear  $\text{Ne} \cdots \text{I}^{35,37}\text{Cl}(X, v''=0)$  isomers are observed in laser-induced fluorescence spectra recorded in the  $\text{ICl } B-X, 2-0$  and  $3-0$  spectral regions. The T-shaped complexes access the lowest intermolecular vibrational level within the  $\text{Ne} + \text{ICl}(B, v')$  potential, while the linear complexes access at least four different bending levels that are delocalized in the angular coordinate. The ground state binding energy of the linear  $\text{Ne} \cdots \text{I}^{35}\text{Cl}$  isomer is directly measured in two-laser, action spectroscopy experiments. A continuum signal is observed with a turn on at  $17\,748.4 \text{ cm}^{-1}$  that indicates a binding energy of  $84.3(2.3) \text{ cm}^{-1}$  for the ground state complex. The ground state binding energy of the T-shaped isomer can be estimated by fitting the  $\text{Ne} \cdots \text{I}^{35}\text{Cl}(B, v'=2)$  bending levels that the ground state linear isomer accesses to an  $\omega_e, \omega_e \chi_e$  progression. The fit reveals a binding energy of  $60.8(3.2) \text{ cm}^{-1}$  for  $\text{Ne} \cdots \text{I}^{35}\text{Cl}(B, v'=2)$ , which implies a T-shaped ground state binding energy of  $66.2(3.2) \text{ cm}^{-1}$  based upon the spectroscopic shift of the T-shaped feature from the  $\text{I}^{35}\text{Cl } B-X, 2-0$  transition. Two-laser, pump-probe experiments were also performed to access the intermolecular vibrational levels that are bound within the  $\text{Ne} + \text{ICl}(E 0^+, v=10)$  ion-pair state. In these experiments, the pump laser was fixed on either the lowest energy level, with a T-shaped equilibrium geometry, or one of the higher energy delocalized levels within the  $\text{Ne} + \text{I}^{35}\text{Cl}(B, v'=2)$  well. In this manner, varying  $\text{Ne} \cdots \text{I}^{35}\text{Cl}$  Franck-Condon windows between the  $B$  and  $E$  states are accessed and assignments of the intermolecular vibrational levels within the ion-pair state can be made. The results suggest a  $\text{Ne} + \text{ICl}(E 0^+)$  potential with the lowest bound level localized in the T-shaped orientation and that the higher energy levels are delocalized in the angular coordinate.