The emission spectrum of HfCl has been investigated in the 3000-18500 cm\(^{-1}\) region at high resolution using a Fourier transform spectrometer. The bands were excited in a microwave discharge through a flowing mixture of HfCl\(_4\) and helium. Two bands near 17140 cm\(^{-1}\) and 17490 cm\(^{-1}\) were also measured in absorption using laser excitation spectroscopy. In this instance the molecules were created by laser ablation in a molecular beam apparatus. The observed bands have been classified into two electronic transitions, [7.6]4\(\Delta_3\) - X3\(\Delta_3\) and [17.1]4\(\Delta_3\) - X3\(\Delta_3\) involving a common lower state. A rotational analysis of the 0-0 and 1-1 bands of [7.6]4\(\Delta_3\) - X3\(\Delta_3\) and 0-0, 1-1 and 1-0 bands of the [17.1]4\(\Delta_3\) - X3\(\Delta_3\) transitions, has been carried out and the equilibrium spectroscopic constants have been determined. The ground state principal molecular constants are, \(r_e=0.1097404(54)\) cm\(^{-1}\), \(\alpha_e=0.0004101(68)\) cm\(^{-1}\) and \(r_e=2.290532(57)\) Å.

The \textit{ab initio} calculations have been performed on HfCl and spectroscopic properties of the low-lying electronic states have been predicted. The ground state is predicted to be a regular \(\Delta^3\) state arising from the valence electron configuration, \(10\sigma^22\pi^23\sigma^21\pi^6\). On the basis of our \textit{ab initio} calculations, we assign the observed transitions as [7.6]4\(\Delta_3\) - X3\(\Delta_3\) and [17.1]4\(\Delta_3\) - X3\(\Delta_3\).