# Study of 2-Chloro-4-fluoroanisole by two-color resonant two-photon mass-analyzed threshold ionization spectroscopy

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We applied the resonant two-photon ionization (R2PI) and mass-analyzed threshold ionization (MATI) spectroscopic techniques to record the vibronic and cation spectra of 2-chloro-4-fluoroanisole (2C4FAN). The band origin of the $S_1 \leftarrow S_0$ electronic transition of 2C4FAN was found at 34 621 ± 2 $cm^{-1}$ and the adiabatic ionization energy was determined to be 67 204 ± 5 $cm^{-1}$. These spectra provide information about the active vibrations of this molecule in the electronically excited $S_1$ state and cationic ground $D_0$ state. Comparing these experimental data of 2C4FAN with those of o-chloroanisole, p-fluoroanisole, and anisole, we can learn the effect of the nature and the location on the ring of substituents on transition energy and molecular vibration.