MICROWAVE SPECTRA OF $^{18}$O-TROPOLONE AND D-TROPOLONE

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Tropolone is a seven-membered ring with an intramolecular hydrogen bond between the hydroxyl proton on C$_1$ and the carbonyl oxygen on C$_3$. The proton tunnels between the two neighboring oxygen atoms. Microwave spectra of singly-substituted $^{18}$O-tropolone and of singly-deuterated tropolone were measured to determine the effect of these two substitutions on the proton tunneling dynamics. The $0^+$ state of $^{18}$O-tropolone and both the $0^+$ and $0^-$ states of D-tropolone were observed and assigned. Analysis of the spectra reveals complete quenching of the tunneling splitting of $^{18}$O-tropolone. The energy separation between the $0^+$ and $0^-$ states in D-tropolone was determined and is found to be significantly smaller than that of normal tropolone.