

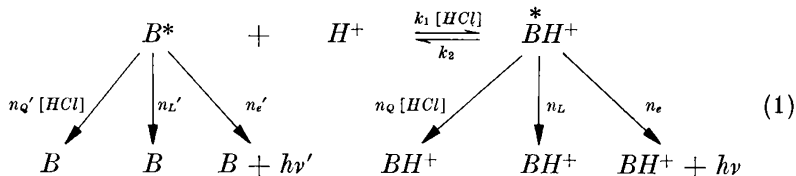
The Rate of Protonation of Excited Methyl-2-Naphthyl Ketone in Aqueous Solution

With 2 figures

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The first measurement of the rate constants of a proton transfer reaction of a molecule in the first excited singlet state was made nearly 20 years ago by WELLER¹, who, by measuring the fluorescence intensities of 2-naphthol as a function of pH , was able to calculate the rates of the forward and reverse reactions for the dissociation of 2-naphthol in the first excited singlet state. Since then, similar investigations of the excited state dissociation reaction of a number of weak acids, mainly pyrene derivatives, have been made². The only reported kinetic analysis of the protonation of an excited base is that for the acridine molecule, which is a weak base in the ground state and a moderately strong base in the excited state³. No corresponding measurements have been reported for weak bases in the excited state. This communication reports the first determination of kinetic parameters for the protonation of a weak base in the first excited singlet state.

The method used depends on observing the fluorescence behaviour of the weak base as a function of acid concentration under conditions where the added mineral acid acts not only as a source of protons, but also as a quencher for the excited state species. In this case, excitation of a molecule unprotonated in the ground state leads to the following reaction scheme in the excited state:



¹ A. WELLER, Z. Elektrochem. **56** (1952) 662.

² A. WELLER, Progr. React. Kinet. **1** (1961) 187.

³ A. WELLER, Z. Elektrochem. **61** (1957) 956.