# BASE-INDUCED CHEMILUMINESCENCE OF N-METHYL-9-(DICARBOALKOXYMETHYL)ACRIDANES[1)]

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A new chemiluminescent system (1) which has a $-\overset{|}{C}H-\overset{O}{\overset{\|}{C}}-$ function in it and gives a very effective fluorescent product, N-methylacridone (**2**), was found to give chemiluminescence light emission under basic oxidative conditions. One mole of 1 could be oxidized twice (first at i and then at ii). Hence, it could give two photons a mole. The mechanistic investigation was performed.

N-Methyl-9-(dicarboalkoxymethyl)acridanes (*1*: R = Me, Et, and Ph: $10^{-4}$M) gave long-lasting chemiluminescence ($\tau_{1/2} \sim 40$ h) with moderate intensity ($\Phi_{CL}$: $10^{-4} \sim 10^{-5}$ einstein/mol) at 70°C in basic dimethyl sulfoxide (DMSO) upon oxidized by molecular oxygen.

The final product was **2**, which was proved to be the emitting species (emitter) after a first strong flash. t-Butyl formate (3), which was formed by transesterification of methyl, ethyl, and phenyl formates generated once by t-BuO$^-$ anion respectively under the conditions, was also isolated as the product.

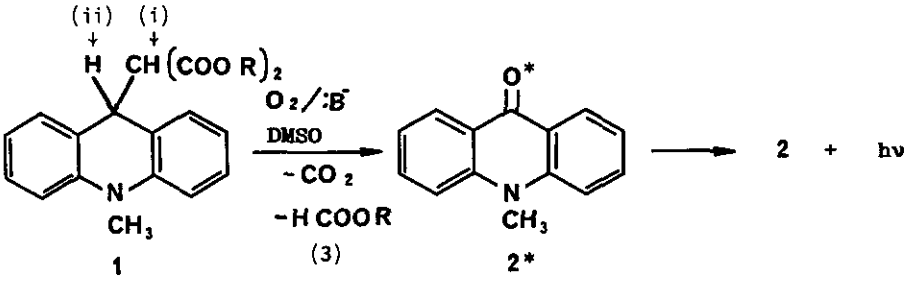


Table 1. CL of the Acridane Compounds (1) at 70°C.

| 1 | $\Phi_{CL}$[a)] (einstein/mol) x $10^5$ | $\lambda_{max}$ (nm) CL[b)] | FL in $O_2$[c)] | FL in Ar[c)] |
|---|---|---|---|---|
| MMA (R = Me) | 8.20 | 435 | 440 | 416 |
| MEA (R = Et) | 7.26 | 435 | 440 | 364 |
| MPA (R = Ph) | 1.27 | 435 | 440 | 470 |
| NMA (1) | —— | —— | 435,[b)] 440[c)] | —— |

a) Relative to the Hasting's standard. b) Slit width 40 nm. c) Slit width 24 nm.

1) Cyclic peroxides. 10.