

CHEMILUMINESCENCE OF MONOCYCLIC 3,6-DISUBSTITUTED PYRIDAZINES¹⁾

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Luminol, the famous chemiluminescent compound, gives strong light emission when oxidized either by hydrogen peroxide in an aqueous solution in the presence of a catalyst (such as hemoglobin) or by molecular oxygen in dimethyl sulfoxide (DMSO) under the basic condition (such as t-BuOK). Many mechanisms have been proposed for the reactions. Aminophthalate anion is believed to be the emitter.

On the course of studies of luminol chemiluminescence, we found a chemiluminescent (CL) reaction of monocyclic 3,6-substituted pyridazines which have no condensed aromatic moieties like luminols studied formerly. We describe here the CL reaction of the monocyclic pyridazines induced by the oxygenation with molecular oxygen in DMSO in the presence of t-BuOK. Although the CL reaction of the 3,6-dihydroxy derivatives (4a and 4b) seems to proceed through a similar mechanism to that of luminol (Scheme 3), different mechanisms (Scheme 2) are to be plausible for the other pyridazines (1-3 and 5) employed.

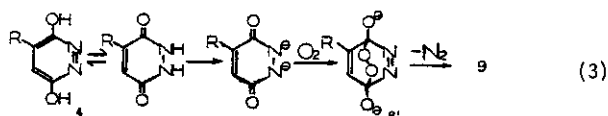
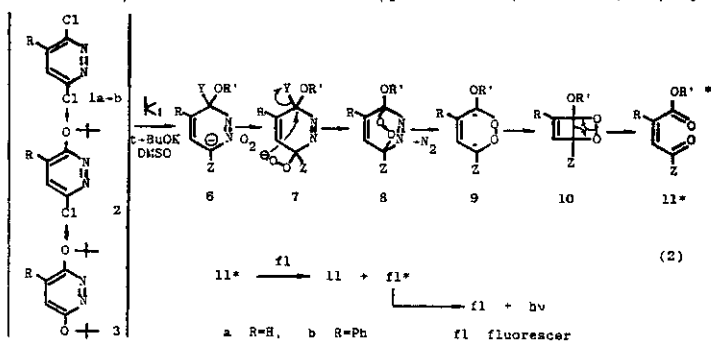


Table 1 Quantum Yields of CL of 1,4-Pyridazines

R	Y	Z	$\phi_{CL}^a \times 10^5$		λ_{max} (nm)	
			t-BuOK/O ₂	t-BuOK/vac - O ₂	CL	FL
1a	H	Cl	9.8	11.2	540±10	540±5 ^b
2a	H	Cl	9.8	9.8	510±10	510±5 ^b
3a	H	O-t-Bu	5.4	2.5	480±10	475±5 ^b
4a	H	OH	298	235	445±10	445±5
5a	H	OMe	6.3	7.0	—	440±5 465±5 500±5
1b	Ph	Cl	2.6	2.5	510±10	510±5
4b	Ph	OH	80	116	500±10	510±5

a) relative to luminol.

b) FL in vacuo.

1) Cyclic Peroxides. 9. A part was presented in *Heterocycles*, **19**, 1415 (1982).