

Chemiluminescence Studies Using Some Non Steroidal Anti-Inflammatory Drugs with Benzoyl Hydroperoxide

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Abstract: The oxidation of luminol with benzoyl hydroperoxide (BzOOH) in alkaline medium was studied. The reaction occurring between luminol and benzoyl hydroperoxide in alkaline medium leads to the production of nitrogen gas with simultaneous emission of CL. The effect of non-steroidal anti-inflammatory drugs (NSAIDS) like diclofenac sodium, analgin & paracetamol has also been studied. The time dependence of the CL intensity of luminol and benzoyl hydroperoxide at different temperature and the CL emission spectra of the reactions have been recorded for better understanding of the reaction.

Keywords: Chemiluminescence, Luminol, Benzoyl hydroperoxide, Non-steroidal anti-inflammatory drugs like Diclofenac sodium, Analgin & Paracetamol.

I. INTRODUCTION

Chemiluminescence (CL) is the simultaneous production of electromagnetic radiation (UV, Visible or IR) observed when a chemical reaction yield an electronically excited intermediate or product, which either luminesces or donates its energy to another molecule which then luminesces¹. As one of the important approaches of light emission, chemiluminescence induced by chemical reactions has evoked considerable interest for its potential applications in chemical detection, bioanalysis, and cold light source².



Figure: Example showing Chemiluminescence

It has been suggested that breakdown of organic hydroperoxide generates ¹O₂ (singlet oxygen). This singlet oxygen may be the source of the chemiluminescence (CL) observed during lipid peroxidation³. Decomposition of organic hydroperoxides by metals could yield alcohols, ketones, peroxy and alkyl radicals which are capable of generating CL. The decomposition of CuOOH catalyzed by transition metal ions or haeme compounds have been found to exhibit CL. The use of luminol increase the sensitivity of such CL reaction⁴. In 1999, Tsaplev⁵ proposed an alternative light-producing pathway for the oxidation of linear hydrazides with hypochlorite, in which the formation of an electronically excited state of molecular nitrogen was discussed. Reaction of t- Butyl hydroperoxide with phenyl hydrazine hydrochloride in presence and absence of luminol has been discussed by Khan and Chandel et al.⁶