Chinese Journal of Chemistry 2005 23 (7): 918-924 ISSN: 0567-7351 CN: 31-1320/06

FULL PAPERS

呋喃西林水溶液在光和热作用下的稳定性

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收稿日期 2004-9-23 修回日期 2005-3-28 网络版发布日期 接受日期

摘要 研究了呋喃西林水溶液在光和热同时作用下的稳定性，
结果表明呋喃西林水溶液在高温避光或在高温光照条件下都符合零级反应规律，
在光和热同时作用下的总反应速率常数k_{total}可分解为$k_{total}=k_{dark}+k_{light}$，
其中k_{dark}和k_{light}分别为避光时热反应的降解速率常数及光化反应的降解速率常数。且k_{light}可表达为$k_{light}=A_{light}\cdot\exp(-E_{a,\,light}/RT)\cdot E$，其中E为光源的照度，$A_{light}$和$E_{a,\,light}$都是实验常数。结果表明，$A_{light}$和$E_{a,\,light}$的值都随光源不同而改变。为节省时间和样品，减少工作量，采用了指数程序升温法，
并和经典恒温法进行了比较。结果表明，在避光条件和在不同光源照射下，
由指数程序升温法求得的动力学参数都与经典恒温法一致。

关键词 呋喃西林, 光稳定性, 指数升温法

分类号

Influence of Light and Heat on the Stability of Nitrofurazone Solution

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Abstract The influence of both light and heat on the stability of nitrofurazone aqueous solution was studied. Results show that in either heating experiments or the exposure to light at high temperatures, the degradation rate obeyed zero-order kinetics. The total rate constant k_{total} caused by both light and heat can be divided into two parts: $k_{total}=k_{dark}+k_{light}$, where k_{dark} and k_{light} are the degradation rate constantscaused by heat and light, respectively. The k_{light} can be expressed as $k_{light}=A_{light}\cdot\exp(-E_{a,light}/RT)\cdot E$, where E is the illuminance of light, and A_{light} and $E_{a,light}$ both are experimental constants. The values of these kinetic parameters were determined based on the experiments in the dark and upon exposure to three different light sources. Results show that the values of A_{light} and $E_{a,light}$ varied with the light source. To save time, labor, and drugs, exponential heating experiments were employed and compared with the isothermal experiments. Results indicated that kinetic parameters obtained by exponential heating experiments are comparable to those obtained by isothermal experiments either in the dark or upon exposure to light.

Key words nitrofurazone photo-stability exponential heating experiment

DOI:

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