化学学报 2001 59 (3): 360-365 ISSN: 0567-7351 CN: 31-1320/06

脉冲直流放电-LIF法CCl~2(A'B~1和a^3B~1)自由基被醇类分子 猝灭动力学研究

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收稿日期 修回日期 网络版发布日期 接受日期

摘要 CCl~4/Ar混合气体进行脉冲高压直流放电产生CCl~2自由基，再用YAG泵浦的染料激光输出的541.52nm激光将电子基态CCl~2激励到电子激发态A^1B~1(0,4,0)模的P^R~1能级上，通过检测激发态CCl~2自由基的时间分辨荧光信号，测得了室温下(293K)激发态CCl~2自由基被醇类分子猝灭的动力学结果，根据我们提出的三能级模型来分析处理这些实验数据，首次获得了激发态CCl~2自由基被醇类分子猝灭的态分辨的速率常数k~q~1，k~q~2和k~q~3的值，并对这些数据与猝灭剂的结构关系进行了分析讨论。

关键词 醇 猝灭速率常数 动力学研究 二氯化碳

分类号 0643

Kinetic studies on quenching of CCl~2 (A'B~1 and a^3B~1) by alcohols by pulse-DC-discharge method

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Abstract CCl~2 free radicals were produced by DC discharge of CCl~4 (in Ar). Ground state CCl~2 radical was electronically excited to P^R~1 level of A^1B~1(0, 4, 0) state with Nd:YAG laser pumped dye laser at 541.52 nm. Experimental quenching data of CCl~2 (A 1^B~1 and a 3^B~1) by alcohols were obtained by observing time-resolved fluorescence signals from the excited CCl~2 radicals transition, which showed a superposition of two exponential decay components. The state-resolved rate constants k~q~1, k~q~2 and k~q~3 were acquired for the first time by analyzing the data using three-level-model developed by us. The k~q~1, k~q~2 and k~q~3 increase on the whole with increasing the number of C-H bonds in alcohols. A discussion on the effect of OH group and molecular structure in alcohol on the effect of OH group and molecular structure in alcohol on the quenching of excited CCl~2 radical is presented.

Key words ALCOHOL KINETIC STUDY

DOI:

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