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直流脉冲放电产生SO分子束:$A'^3 \rightarrow X^3\Sigma^-$跃迁

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摘要 采用直流脉冲高压对SO_2/He(配比1:99，总压强3.0×10^5Pa)混合气体放电产生SO超声分子束,SO自由基由电离其前体SO_2再解离而形成. 发射光谱中350~500 nm波长范围的电子振动谱标识为SO($A'^3 \rightarrow X^3\Sigma^-$)跃迁,通过对实验谱线拟合，获得了该跃迁的带源$\nu_{00}$ = 29524(8) cm^{-1},SO($A'^3\Delta$)的光谱常数ω'_e = 742(6) cm^{-1}, $\omega'_e\chi'_e$ = 5.9(2.0) cm^{-1}, 以及基电子态的光谱常数ω''_e = 1165(5) cm-1, $\omega''_e\chi''_e$ = 6.4(0.5) cm-1.

关键词 SO自由基 分子常数 禁戒跃迁

分类号 O561.3

Generation of SO molecular beam by pulsed DC discharge:$A'^3 \rightarrow X^3\Sigma^-$ransition(Chinese)

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Abstract

The sulfur oxide radical (SO) molecular beam was generated by DC pulsed discharging the SO_2 seeded in helium with the ratio of 1:99 at total pressure of 3.0×10^5 Pa in the supersonic expansion. The emission spectrum in the range of 350-500 nm was assigned to the $A'^3 \rightarrow X^3\Sigma^-$ system of SO. The generation of SO free radical was interpreted to be Penning ionized from its precursor SO_2 then further dissociated. Analyzing the medium resolution SO vibronic spectra, the molecular constants of the states of SO involved in the transition are determined to be ν_{00} = 29524(8) cm^{-1}, ω''_e = 1165(5) cm-1, $\omega''_e\chi''_e$ = 6.4(0.5) cm-1, ω'_e = 742(6) cm^{-1}, $\omega'_e\chi'_e$ = 5.9(2.0) cm^{-1}.

Key words SO radical molecular constants forbidden transition

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