

计量测试

燃烧产物组成激光诱导荧光光谱的测量

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摘要 对激光诱导荧光(LIF)光谱技术在燃烧过程中的应用进行研究, 介绍测量燃烧过程中常见自由基OH和NO的LIF光谱的实验方案, 以及采用激光诱导荧光光谱技术测量小分子荧光光谱的方法, 利用YAG激光器、染料激光器、CO₂激光器、光谱仪、ICCD等设备对燃烧产物中常见小分子自由基OH和NO进行了测量, 从实验中得到了自由基OH和NO的荧光光谱。实验结果表明, 荧光光谱与激发波长无关, 但是激发波长改变后, 荧光强度因离开最佳波长而有所下降, 这符合分子荧光光谱的特征。与其他光谱技术相比, 激光诱导荧光光谱技术具有极高的选择性和灵敏度。

关键词 [激光诱导荧光光谱](#) [激发波长](#) [荧光强度](#) [OH自由基](#) [NO自由基](#)

分类号

Laser-induced fluorescence spectra measurement of combustion product components

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Abstract Laser induced fluorescence (LIF) spectrum technique is introduced to study combustion process. The experimentation for LIF spectrum of small molecules common in combustion process is described and its results are given. Experimental schemes are designed to measure the spectrum of OH and NO free radicals by the technique of LIF. OH free radical in alcohol burner and candle flame and NO free radical in B/KNO₃ pyrolyzing and laser ignition are measured by instruments of YAG laser, dye laser, CO₂ laser, spectrometer and ICCD. Experiment results show that fluorescence spectrum is independent with excitation wavelength, but the fluorescence intensity may be decreased when the excitation wavelength changes because the fluorescence deviates from optimal wavelength. The experiment shows that the results agree with fluorescence spectrum characteristics. In comparison with other techniques, the LIF spectrum technique possesses the advantages of superior selectivity and sensitivity.

Key words [spectrum of laser induced fluorescence \(LIF\)](#) [excitation wavelength](#) [fluorescence intensity](#) [OH free radical](#) [NO free radical](#)

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