

## 激光烧蚀La~2O~3产生的等离子体的发光光谱研究

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**摘要** 用发光光谱法研究了355nm脉冲激光在真空和O~2气氛中烧蚀La~2O~3产生的等离子体的组成和形成过程。对等离子体中La<sup>+</sup>离子和LaO的空间和时间分辨发光光谱分析表明,在O~2气氛中LaO有两个生成通道:一是在靶附近的等离子体内直接生成的,另一是由La,La<sup>+</sup>与O<sup>2</sup>发生氧化反应而生成的。测定了激光能量密度,离靶表面的距离和O~2压力对产物发光的延迟时间和发光强度的影响。此外,还讨论了激光烧蚀La~2O~3诱导产生等离子体的形成和演化机理。

**关键词** [激光烧蚀](#) [等离子体](#) [发光光谱](#) [氧化镧](#)

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## Time-resolved emission spectrometric study on laser ablated plasma from a La~2O~3 target

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**Abstract** The composition and the evolution of the 355nm laser ablated plasma from a La~2O~3 target both in vacuum and in ambient O~2 were investigated by using time-resolved emission spectrometry. Our results show that the excited La<sup>+</sup> and LaO\* are two main emission species. It is suggested that there are two pathways for the formation of LaO\* in ambient O~2, one is the direct production via laser-target interaction, and the other is the formation via the oxidation of La and La<sup>+</sup>. The dependence of the delay time and the intensity of the emission on the laser fluence, the observation distance away from the target surface, and the ambient O~2 pressure were examined. A kinetic model based on the interactions between the ablated species and the ambient O~2 is proposed to explain the experimental results satisfactorily. The mechanism of the plasma formation and evolution is also discussed.

**Key words** [PLASMAS](#) [LUMINESCENT SPECTRA](#) [LANTHANUM OXIDE](#)

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