

鲁米诺在铂电极上阳极电致化学发光的机理研究

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**摘要** 研究了碱性鲁米诺溶液在多晶铂电极上的阳极电致化学发光(ECL)行为,观察到电极的预极化处理和溶解氧跟发光峰强度和峰形有直接关系。结合XPS谱图和Pt,Pt|S~a~d~s修饰电极的循环伏安特性,给出了鲁米诺阳极ECL两个发光通道的可能反应机理:(1)鲁米诺阴离子在表面有新鲜Pt原子的电极上氧化生成鲁米诺自由基,然后迅速与溶液中的氧反应形成0.22V(vs.Ag)处的发光肩峰;(2)电极表面的铂氧化物能加速原子态氧的发生过程,并增大0.60V(vs.Ag)附近ECL主峰的发光强度。

**关键词** [鲁米诺](#) [多晶](#) [铂电极](#) [阳极](#) [电致发光](#) [发光机制](#) [预极化处理](#)

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## Mechanistic study of the anodic electrochemiluminescence of luminol at platinum electrode

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**Abstract** The behavior of anodic electrochemiluminescence (ECL) of luminol in alkaline solution at a polycrystalline platinum electrode was studied. It was found that the ECL intensity and peak shape were related to pre-polarization of the platinum electrode and oxygen dissolved in the solution. Furthermore, the surface state of platinum electrode was detected under different conditions by XPS and CV characteristics of Pt and Pt|S~a~d~s electrodes. The possible mechanism for the two anodic ECL channels is proposed: (1)Two conditions are necessary for formation of the anodic ECL shoulder peak at 0.22V(vs.Ag). One is the oxygen dissolved in solution and another is that there are fresh Pt atom sites on the electrode surface. The luminol anion is electro-oxidized to luminol radical, which can react with dissolved oxygen to generate light emission. (2) Platinum oxides on the electrode surface can accelerate the producing rate of atomic oxygen. This leads to the enhancement of ECL intensity of the peak near 0.60V(vs.Ag).

**Key words** [LUMINOL](#) [POLYCRYSTAL](#) [PLATINUM ELECTRODE](#) [ANODES](#) [ELECTROLUMINESCENCE](#) [LUMINOUS MECHANISM](#)

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