

掺杂Cs₂O的12CaO·7Al₂O₃型发射材料的制备与特性

Preparation and Characterization of Storage and Emission Functional Material of Cs₂O-doped 12CaO·7Al₂O₃

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中文摘要

研究了掺杂Cs₂O的12CaO·7Al₂O₃(C12A7)型负离子存储发射材料的发射特性、离子发射分支比以及温度对发射强度的影响, 同时对该材料的X射线衍射和电子顺磁共振的表征结果进行了分析. C12A7中Cs₂O的掺入不仅降低了发射温度, 同时还增强了发射强度. 掺杂Cs₂O后, 在800 V/cm的引出场下, 发射温度由570 oC降低至500 oC, 在700 oC时, 发射强度由0.23 μA/cm²

英文摘要

We provides a novel approach to generate low-temperature atomic oxygen anions (O⁻) emis-sion using the cesium oxide-doped 12CaO·7Al₂O₃ (Cs₂O-doped C12A7). The maximal emis-sion intensity of O⁻ from the Cs₂O-doped C12A7 at 700 oC and 800 V/cm reached about 0.54 μA/cm², which was about two times as strong as that from the un-doped C12A7(0.23 μA/cm²) under the same condition. The initiative temperature of the O⁻ emission from the Cs₂O-doped C12A7 was about 500 oC, which was also much lower than the initiative temperature from the un-doped C12A7 (570 oC) in the given field of 800 V/cm. High pure O⁻ emission close to 100% could be obtained from the Cs₂O-doped C12A7 under the lower temperature (<550oC). The emission features of the Cs₂-doped C12A7, including the emis-sion distribution, temperature effect, and emission branching ratio have been investigated in detail and compared with the un-doped C12A7. The structure and storage characteristics of the resulting material were also investigated via X-ray diffraction and electron paramagnetic resonance. It was found that doping Cs₂ to C12A7 will lower the initiative emission temperature and enhance the emission intensity.

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