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研究论文

溶剂热法制备太阳电池用$NaYF_4$:Yb^{3+}, Er^{3+}纳米上转换材料

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摘要:

用溶剂热法合成Yb^{3+}、Er^{3+}共掺的$NaYF_4$纳米上转换材料, 研究了去离子水、乙醇两种反应溶剂对材料性能的影响. 用X射线衍射光谱、扫描电镜和荧光光谱等测试手段对材料性能进行了对比分析. 结果表明: 以乙醇为溶剂并加入一定比例的EDTA, 所制备的上转换材料能发射较强的、可被太阳电池吸收的可见光.

关键词: 无机非金属材料 溶剂 去离子水 乙醇 乙二胺四乙酸二钠(EDTA) 上转换

Optimized solvent-thermal preparation of $NaYF_4$:Yb^{3+}, Er^{3+} up-conversion nanoparticles for application in solar cells

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Abstract:

Nanoparticles of Yb^{3+}, Er^{3+}-codoped sodium yttrium fluoride were prepared by solventthermal method. The properties of the prepared materials were characterized. The up-conversion luminescent properties of the $NaYF_4$: Yb^{3+}, Er^{3+} nanoparticles were investigated. The effect of deionized water and ethanol as reaction medium on the performance of the up-conversion materials was studied. The results showed that the up-conversion nanoparticles had relatively high up-conversion effect when ethanol was used as reaction medium and simultaneously ethylenediaminetetraacetic acid (EDTA) was also added. The up-conversion phosphors emit visible light which could be well utilized by solar cells.

Keywords: inorganic non-metallic materials solvent deionized water ethanol ethylenediaminetetraacetic acid (EDTA) up-conversion

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