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论文**SiO₂纳米颗粒对R6G-乙醇溶液荧光光谱影响**杨爱玲^a,赵维娜^b,杨云^a,姚超^a

(中国海洋大学 a.信息科学与工程学院|b.海洋地球科学学院,山东 青岛 266100)

摘要:

在 3×10^{-4} M和 1×10^{-4} M浓度的R6G-乙醇溶液中分别掺杂了8个不同浓度的SiO₂纳米颗粒($107 \sim 1012$ 个/mL).研究了SiO₂纳米颗粒(100 nm)对若丹明6G(R6G)荧光光谱的影响,结果表明:n₁~n₄(1012~1010个/mL)浓度掺杂的SiO₂纳米颗粒在549 nm处有很好的荧光增强作用,对570 nm处的荧光峰有明显的猝灭作用;n₅~n₈(109~107个/mL)浓度掺杂的SiO₂纳米颗粒在549 nm处没有明显的荧光增强作用,但对570 nm处的荧光峰有增强作用,荧光增强因子可达10%~20%.荧光增强与猝灭的原因在于纳米颗粒对荧光的散射作用和R6G无荧光H-型二聚体或荧光J-型二聚体的形成.

关键词: 若丹明6G-乙醇溶液 SiO₂纳米颗粒 荧光光谱 二聚体

Influence of SiO₂ Nanoparticles to Fluorescence Spectra of Ethanol-Rhodamine 6G SolutionsYANG Ai-ling^a,ZHAO Wei-na^b,YANG Yun^a,YAO Chao^a

(a.College of Information Science and Technology|b.Geo-science College,Ocean University of China,Qingdao,Shandong 266100,China)

Abstract:

SiO₂ nanoparticles with eight different concentrations were doped in the Rhodamine 6G-ethanol solutions(3×10^{-4} M and 1×10^{-4} M).The influence of SiO₂ nanoparticles to the fluorescence spectra of R6G-ethanol solutions were investigated.The results shows:1)when the concentrations of SiO₂ within in the range of n₁~n₄(1012~1010/mL),the fluorescence spectra at 549 nm were well enhanced,but the fluorescence peaks at 570 nm was obviously quenched and the peaks have a red shift|2) when the concentrations of SiO₂ within in the range of n₅~n₈(109~107/mL),the fluorescence spectra at 549 nm were not enhanced significantly,but the fluorescence peaks at 570 nm was obviously enhanced,the enhancement factors can get to 10%~20%,and the peaks do not have a red shift.The reasons of the fluorescence enhancing or quenching are relative to the scattering of the nanoparticles to the luminescence and the non-fluorescent H-dimers or fluorescent J-dimers of R6G molecules.

Keywords: Rhodamine 6G-ethanol solutions SiO₂ nanoparticles Fluorescence spectra Dimers

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作者简介:**参考文献:**

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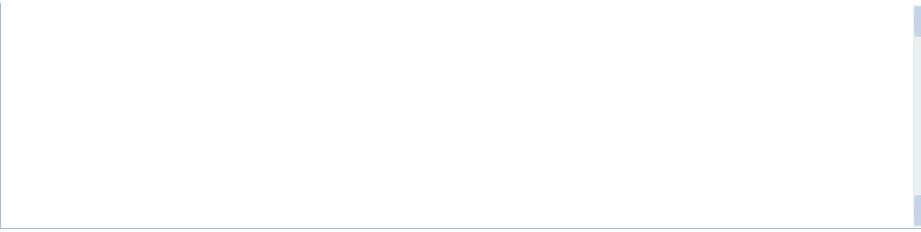
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