

ZnS包覆 SiO₂核壳和空腔结构纳米球制备研究

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摘要 ZnS包覆SiO₂三维核壳结构或空腔结构纳米球可用于光子晶体的组装. 本实验采用层层自组合法, 利用二氧化硅模板表面的静电作用吸附纳米晶粒子, 生成纳米晶包覆层, 制备核壳结构的SiO₂@ZnS和SiO₂@ZnS:Mn²⁺纳米球. 控制氢氟酸对二氧化硅的蚀刻程度, 制备了空腔型硫化锌纳米球. 采用XRD、UV、PL、TEM、SEM、AFM等测试手段对核壳结构和空腔型硫化锌纳米球进行了表征. 结果表明ZnS纳米晶包覆SiO₂后, 在其表面形成了包裹紧密、形貌规整、粒径均一的ZnS壳层; 经5% 氢氟酸蚀刻得到的空腔纳米球结构完好、厚度均匀.

关键词 [光致发光](#) [ZnS](#) [纳米晶](#) [核壳结构](#) [空腔纳米球](#)

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Preparation of Core-shell SiO₂/ZnS and Hollow Nanospheres

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Abstract SiO₂ coated by ZnS nanocrystalline three-dimensional core-shell or hollow nanospheres can be used as building blocks for photonic crystals. To produce these particular three-dimensional nano-materials, a layer-by-layer self-assembled method was used. The electrostatic on the surface of nanometer SiO₂ templates could absorb ZnS nanocrystal and form a layer of thickness-controlled shell. The hollow nanospheres were produced by 5% hydrofluoric acid etched the SiO₂ templates. The core-shell structure and hollow nanospheres were verified by XRD, UV, PL, TEM, SEM and AFM. The results indicate that after the SiO₂ is coated by ZnS nanocrystalline, the core-shell surface is close and neat, and the particle size is homogeneous. The configuration of ZnS hollow nanospheres is intact, and the thickness is well-distributed.

Key words [fluorescent](#) [sulfur zinc](#) [nanocrystalline](#) [core-shell structure](#) [hollow nanosphere](#)

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