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快速均匀沉淀法制备纳米微粒ZnS

杨富国[1,2], 朱琼霞[2], 方 正[1]

(1·中南大学化学化工学院,湖南长沙 410083;
2·安徽师范大学化学与材料科学学院,安徽芜湖 241000)

摘 要：采用快速均匀沉淀法在水相体系中制备纳米微粒ZnS.快速均匀沉淀法是利用酸度、温度对反应物解离的影响,在一定条件下制得含有所需反应物的稳定前体溶液,通过迅速改变溶液的酸度、温度来促使颗粒大量生成,并借助表面活性剂防止颗粒团聚,从而获得均匀分散纳米颗粒,它具有均匀性较好、沉淀快速、冷却迅速的特点.以硫代乙酰胺(CH_3CSNH_2,简称TAA)和硝酸锌($Zn(NO_3)_2$)为反应前驱体,用一定量的浓HNO_3调节pH为1~2,用0.45μm的微孔膜过滤,恒温陈化一段时间成核后,将该起始溶液迅速倒入含有面活性剂OP的冷氨水中(氨水预冷至0~2℃),混合完毕后再继续轻微搅拌5 min左右,浑浊一段时间,离心分离并用蒸馏水、乙醇等多次洗涤,得到无团聚、粒度分布窄、粒径为30~40 nm的球形ZnS微粒.对纳米微粒ZnS进行了红外光谱、荧光光谱分析,结果表明:该微粒无红外吸收,在激发波长为290 nm时,荧光发射峰在350 nm处;该法具有实验简单、操作方便、产率高、制得的纳米微粒粒径均一等特点.

关键字：纳米微粒; ZnS;快速均匀沉淀法

Preparation of nanoparticles ZnS by quick homogeneous precipitation

YANG Fu-guo[1,2],ZHUQiong-xia[2],FANG Zheng[1]

(1.College of Chemistry and Chemical Engineering, Central South University, Changsha 410083, China;
2.College of Chemistry and Material Science, Anhui Normal University, Wuhu 241000, China)

Abstract: The nanoparticles ZnS were prepared by the method of quick homogeneous precipitation, which makes use of acidity and temperature affecting the disintegrate of reactant, and in stable condition, acquires a solution of stable precursors. Changing acidity and temperature of solution quickly produces a great quantity of particles, prevents reunite of the particles by surfactant, and at last obtains nanoparticles with homogeneous and disperses. It has good homogeneous,quick precipitate and rapid cooling. Take TAA and $Zn(NO_3)_2$ as rawmaterial by use of HNO_3 adjusted pH for 1~2, filtered with 0.45μm film after nucleation, put primary solution into cold $NH_3·H_2O$with surfactant OP(0~2℃), stir it for 5 min, react for some time. Spherical nanoparticles ZnS were obtained with size of 30~40 nm and a narrow grain size distribution by surfactant OP. IR and fluorescence properties of this ZnS were studied. The results show that IR of ZnS nanoparticles has no absorption. When stirred wavelength is 290 nm, fluorescence emission wavelength is 350 nm. The method is simple in preparing the sample and convenient in operation.

Key words:nanoplarticle; ZnS; quick homogeneous precipitation method

地 址：湖南省长沙市中南大学 邮编： 410083
电 话： 0731-88879765 传真： 0731-88877727
电子邮箱： zngdxb@mail.csu.edu.cn 湘ICP备09001153号