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聚合物对还原法合成**Pt**纳米粒子过程的影响

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摘要 用H_2还原K_2PtCl_4溶液的方法在常温下合成了Pt纳米粒子，考察了poly(N- isopropylacrylamide) (PNIPA), poly(N-vinylacetamide)(PNVA)和poly (vinylalcohol)(PVA)
等三种可溶于水的聚合物对Pt纳米粒子大小和溶胶稳定性的
影响。TEM和溶胶中加入KCl电解质溶液后溶胶稳定性测定结果表明，以PNIPA为稳
定剂可获得粒径最小的Pt粒子，且溶胶最为稳定。较高的PNIPA/Pt~(2+)摩尔比对
合成小颗粒的Pt纳米粒子有利，而聚合物的分子量对粒子影响不大。Pt晶粒在H_2 气氛下生长过程较为缓慢，
停止通入还原气体H_26h后，晶粒生长才基本完成，但 溶胶在6个月后仍保持良好的稳定性。

关键词 聚合物 铂 纳米相材料 透射电子显微术 晶粒

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Effect of Polymers on the Synthesis of Platinum Nanoparticles by Using Reductive Reaction

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Abstract Platinum nanoparticles were synthesized by reduction of K_2PtCl_4 with H_2 at room temperature. Effect of poly(yV-isopropylaciylamide) (PNIPA), poly(yV-vinylacetamide) (PNVA) and poly (vinylalcohol) (PVA) on the size of the nanoparticles and the stability of colloid was studied. Results of TEM and the stability of the colloid after addition of KCl electrolyte solution indicated that the smallest size of Pt nanoparticle and best stability of the Pt colloid had been achieved by using PNIPA as stabilizer. Higher PNIPA/Pt2+ molar ratio is beneficial to obtaining smaller Pt nanoparticles. No remarkable influence of the molecular weight of PNIPA was observed. The growth of Pt nanoparticles was relatively slow under H2 atmosphere, which has not completed until 6 h after stopping of H2, but the Pt colloid was still stable even after six months.

Key words POLYMER PLATINUM NANOPHASE MATERIALS TEM GRAIN

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