

## 论文

### 以PAMAM树形分子为模板制备Pd纳米簇合物

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#### 摘要:

以酯端基聚酰胺-胺树形分子(PAMAM)为模板在甲醇溶剂中制备了Pd纳米簇合物. 采用紫外-可见分光光度法和红外光谱法研究了Pd<sup>2+</sup>与树形分子的作用机理, 结果表明, Pd<sup>2+</sup>与树形分子内部胺基基团(主要为叔胺基)产生了络合作用. 采用硼氢化钠还原法制备了树形分子包裹的、粒径为2 nm的球形面心立方Pd纳米簇合物. 紫外-可见吸收光谱研究结果表明, Pd<sup>2+</sup>与树形分子的摩尔比越小, 生成的纳米簇合物尺寸越小; 由于高代数树形分子具有封闭结构, 且其内部配体数目较多, 采用较高代数的树形分子(5.5代)比低代数(3.5代)更有利于得到尺寸小、分散性较好的Pd纳米簇合物.

关键词: 聚酰胺-胺(PAMAM)树形分子; 模板法; Pd纳米簇合物; 络合作用

### Preparation and Characterization of Pd Nanoclusters Templated by PAMAM Dendrimers

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#### Abstract:

Pd nanoclusters templated by methoxycarbonyl-terminated poly(amidoamine)(PAMAM) dendrimers were successfully prepared in methanol. The complexation between Pd<sup>2+</sup> ions and dendrimers was investigated by UV-Vis and FTIR spectrophotometric method. These results show that Pd<sup>2+</sup> ions are coordinated with the interior amine groups of PAMAM dendrimers. As shown in HRTEM images, reduction with NaBH<sub>4</sub> resulted in well-dispersed and nearly size monodisperse Pd nanoclusters(2 nm, *fcc*) encapsulated in dendrimers. The investigation of UV-Vis data indicates that the size of particle increases with the metal-to-dendrimer molar ratio. Besides, due to the close-packed spherical periphery and rich ligands in interior cavities, dendrimers of higher generation are more effective for preparing Pd DENS with smaller size and better dispersion.

Keywords: Poly(amidoamine)(PAMAM) dendrimer; Template method; Pd nanocluster; Complexation

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