

研究简报

6-氨基己酸及2-氨基乙磺酸C<sub>60</sub>加成物的合成及溶解性

刘绪峰<sup>a,b</sup>, 官文超<sup>\*1</sup>, 程珍贤<sup>2</sup>

(<sup>1</sup>华中科技大学化学系 武汉 430074)

(<sup>2</sup>湖北大学化学与材料科学学院 武汉 430062)

收稿日期 2004-12-9 修回日期 2005-4-26 网络版发布日期 接受日期

**摘要** 水溶性Fullerenes (C<sub>60</sub>)衍生物的制备对于C<sub>60</sub>的生物学研究具有十分重要的意义. 氨基酸与C<sub>60</sub>的胺化反应可得到水溶性的氨基酸C<sub>60</sub>衍生物. 以C<sub>60</sub>与过量6-氨基己酸或2-氨基乙磺酸(摩尔比为1: 10)于80 °C搅拌反应24 h, 分别得到加成度为5和4的氨基酸C<sub>60</sub>主产物, 产率按加入的C<sub>60</sub>计算分别为30%, 28%.

氨基酸碳链的长度及加成产物在反应体系中能否及时沉淀析出影响和控制着加成度的大小. C<sub>60</sub>[NH(CH<sub>2</sub>)<sub>5</sub>COOH]<sub>5</sub>H<sub>5</sub> (**3a**)和C<sub>60</sub>(NHCH<sub>2</sub>CH<sub>2</sub>SO<sub>3</sub>H)<sub>4</sub>H<sub>4</sub> (**6a**)用柱层析进一步纯化, 其结构组成经元素分析, <sup>1</sup>H NMR, <sup>13</sup>C NMR, IR所证实. **6a**的水溶性受溶液pH的影响较小, **3a**在不同pH缓冲溶液中的溶解性用光谱法测定, 分别为: pH=10.25时为71.81 mg·mL<sup>-1</sup>, pH=7时为23.68 mg·mL<sup>-1</sup>, pH=3.36时为10.12 mg·mL<sup>-1</sup>. 在波长273 nm处, **3a**的摩尔消光系数为ε=3.43×10<sup>4</sup> L·mol<sup>-1</sup>·cm<sup>-1</sup>.

**关键词** 富勒烯 胺化 6-氨基己酸 2-氨基乙磺酸

分类号

Synthesis and Solubility of 6-Aminohexanoic Acid and 2-Aminoethanesulfonic Acid C<sub>60</sub>

Adducts

LIU Xu-Feng<sup>1,2</sup>, GUAN Wen-Chao<sup>\*1</sup>, CHENG Zhen-Xian<sup>2</sup>

(<sup>1</sup> Department of Chemistry, Huazhong University of Science and Technology, Wuhan 430074)

(<sup>2</sup> Faculty of Chemistry and Material Science, Hubei University, Wuhan 430062)

**Abstract** Preparation of water soluble fullerenes (C<sub>60</sub>) derivatives is meaningful to biological study of fullerenes. Amination reaction of amino-acid with C<sub>60</sub> led to water soluble amino-acid C<sub>60</sub> derivatives. Reaction of C<sub>60</sub> with excess of NH<sub>2</sub>(CH<sub>2</sub>)<sub>5</sub>COO<sup>-</sup>Na<sup>+</sup> (**1**) or (**4**) (molar ratio is 1: 10) at 80 °C for 24 h afforded main amino-acid C<sub>60</sub> adducts with addition degree of 5 and 4, respectively. The yields based on the C<sub>60</sub> added were 30% and 28%, respectively. The addition degree was influenced by the length of hydrocarbon chain of amino-acid and precipitation of C<sub>60</sub> adducts from the reactant. C<sub>60</sub>[NH(CH<sub>2</sub>)<sub>5</sub>-COOH]<sub>5</sub>H<sub>5</sub> (**3a**) and C<sub>60</sub>(NHCH<sub>2</sub>CH<sub>2</sub>SO<sub>3</sub>H)<sub>4</sub>H<sub>4</sub> (**6a**) were further purified by silica column chromatography and characterized by <sup>1</sup>H NMR, <sup>13</sup>C NMR, IR, FAB-MS spectra and elemental analysis. The solubility of **6a** was less pH dependent. The solubility of **3a** in water at different pH was measured by the spectrophotometric method, exhibiting solubility of 71.81 mg·mL<sup>-1</sup> (pH=10.25), 23.68 mg·mL<sup>-1</sup> (pH=7) and 10.12 mg·mL<sup>-1</sup> (pH=3.36). The ε value of **3a** at 272.8 nm was 3.43×10<sup>4</sup> L·mol<sup>-1</sup>·cm<sup>-1</sup>.

**Key words** fullerene amination 6-aminohexanoic acid 2-aminoethanesulfonic acid

DOI:

通讯作者 官文超 [wguan@hust.edu.cn](mailto:wguan@hust.edu.cn)

扩展功能

本文信息

- ▶ [Supporting info](#)
- ▶ [PDF\(0KB\)](#)
- ▶ [\[HTML全文\]\(0KB\)](#)
- ▶ [参考文献](#)

服务与反馈

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [复制索引](#)
- ▶ [Email Alert](#)
- ▶ [文章反馈](#)
- ▶ [浏览反馈信息](#)

相关信息

- ▶ [本刊中 包含“富勒烯”的相关文章](#)
- ▶ [本文作者相关文章](#)

- [刘绪峰a](#)
- [b](#)
- [官文超](#)
- 
- [程珍贤](#)