

论文

## 二氧化碳-环氧丙烷共聚物电纺纤维形貌研究

张璐, 伍晖, 施一平, 方壮熙, 胡平

清华大学化学工程系高分子研究所; 清华大学化学工程系高分子研究所 北京

收稿日期 2004-4-4 修回日期 2004-6-24 网络版发布日期 接受日期

**摘要** 利用电纺丝技术制备了二氧化碳环氧丙烷共聚物超细纤维, 研究了喷丝口电势、纺丝距离、浓度、溶剂等因素对纤维形貌、直径及均一性的影响. 实验结果表明, 利用电纺丝法可以制备直径在小于200nm到7 $\mu$ m二氧化碳环氧丙烷共聚物纤维; 喷丝口电势和浓度对于共聚物电纺丝纤维是否形成串珠结构有重要影响; 电势、距离和纺丝液浓度都对纤维直径及分散系数有较大影响, 在一定范围内, 随着喷丝口电势增加, 纤维平均直径变大而分散系数变小; 纺丝距离增大使得纤维平均直径变小, 分散系数变大; 浓度的增大使得纤维平均直径变大, 分散系数变小; 不同溶剂配制的溶液体系制备的电纺丝纤维形貌有很大差异, 在二氯甲烷和丁酮的体系中, 分别观察到了两组较为集中的直径分布.

**关键词** [电纺丝技术](#) [二氧化碳环氧丙烷共聚物](#) [超细纤维](#) [纤维形貌](#)

分类号

## A STUDY ON THE MORPHOLOGY OF FIBERS ELECTROSPUN FROM POLY(CARBON DIOXIDE-*co*-PROPYLENE OXIDE)

ZHANG Lu, WU Hui, SHI Yiping, FANG Zhuangxi, HU Ping

*Institute of Polymer Science and Engineering; Department of Chemical Engineering; Tsinghua University; Beijing 100084*

**Abstract** Electrospinning technique was employed to obtain ultrafine fibers of poly (carbon dioxide-*co*-propylene oxide). The effects of electrical potential, distance from spinning tip to collector, solution concentration and solvent system on the fiber morphology, fiber diameter and dispersion coefficient were discussed. Morphology and dispersability of electrospun nonwoven mats were determined by scanning electron microscopy (SEM). The results show that fibers of poly(carbon dioxide-*co*-propylene oxide) with a diameter range from less than 200 nm to 7  $\mu$ m can be obtained via electrospinning process. It was also found that the electrical potential and solution concentration were strongly correlated with the formation of bead defects in electrospun fibers. Bead defects occurred at low electrical potential and concentration and the form of the beads changed from sphere to spindle, when the electrical potential or solution concentration increased. Electrical potential, spinning distance and solution concentration were all found to have great influence on the fiber diameter and dispersion coefficient. Below a certain value of electrical potential the average diameter of electrospun fibers increased and the dispersion coefficient decreased with increasing the electrical potential. However, when electrical potential at the spinning tip reached a relatively high value, the trend went opposite due to great instability caused by the high electrical force. With the increase of distance between spinning tip and connector, the average diameter of electrospun fibers declined, while the dispersion coefficient increased. When the solution concentration increased, the average diameter increased, while the dispersion coefficient declined. The results also illustrated that the solvent system may greatly affect the morphology of electrospun fibers. In the CH<sub>2</sub>Cl<sub>2</sub> and butanone solvent system a bimodal distribution of fiber diameters was observed due to jet splitting.

**Key words** [Electrospinning technique](#) [Poly \(carbon dioxide-\*co\*-propylene oxide\)](#) [Ultrafine fiber Morphology](#)

DOI:

通讯作者 胡平

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(3451KB\)](#)

▶ [\[HTML全文\]\(0KB\)](#)

▶ [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“电纺丝技术”的 相关文章](#)

▶ [本文作者相关文章](#)

- [张璐](#)
- [伍晖](#)
- [施一平](#)
- [方壮熙](#)
- [胡平](#)