

论文

静电纺丝法制备PVP螺旋纤维及其机理研究

杜建时¹; 杨清彪¹; 王永芝¹; 杨松涛¹; 白杰¹; 王书刚¹; 宋岩¹; 李耀先¹; 王策²

- 1. 吉林大学化学学院, 长春 130023;
- 2. 吉林大学麦克德尔米德实验室, 长春 130012

摘要:

研究了电纺丝聚乙烯吡咯烷酮螺旋纤维的形成条件, 在9kV的电压下, 由于溶液质量分数的增加(12%-24%), 纤维形态呈现出直线→螺旋→折叠→无序的变化趋势; 在质量分数为20%时, 随着纺丝电压的增加, 纤维形态呈现出折叠→螺旋→无序的变化趋势, 同时对螺旋纤维的形成机理进行了讨论, 在纺丝过程中纤维束所带静电荷之间的库仑斥力是形成螺旋纤维的直接动力.

关键词: 静电纺丝; 聚乙烯吡咯烷酮; 螺旋纤维

Preparation of PVP Helical Fibres by Electrospinning and Study on the Mechanism of Helix Formation

DU Jian-Shi¹; YANG Qing-Biao¹; WANG Yong-Zhi¹; YANG Song-Tao¹; BAI Jie¹; WANG Shu-Gang¹; SONG Yan¹; LI Yao-Xian^{1*}; WANG Ce^{2*}

- 1. College of Chemistry, Jilin University, Changchun 130023, China;
- 2. Alan G. Macdiamid Institute, Jilin University, Changchun 130012, China

Abstract:

Helical fibres of PVP were fabricated by electrospinning. The morphologies of helical fibre were observed by Scanning Electron Microscopy. PVP ethanol solutions with different mass fractions(12%, 14%, 16%, 20% and 24%) were electrospun at the voltage of 9 kV. With increase of PVP mass fraction, the morphologies of PVP fiber changed from straight, helical, folded to disordered form. Helical fibres were obtained when the mass fractions of PVP solution changed in the range of 16%-20%. The solutions were also electrospun at different voltages from 6 kV to 13 kV, respectively. The result show those regular helical fibres could be obtained in a wide voltage range when PVP solution with a mass fration of 20% was electrospun. The mechanism of the formation of helical fibre was discussed. Coulomb excluding force between static charge carried by fibres during the process of electrospinning was the main factor to form helical fibre.

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通讯作者: 李耀先; 王策

作者简介:

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