

论文

膨化柞蚕丝内部形态和结构的研究

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摘要:

利用扫描电镜(SEM), 结合拉曼(Raman)光谱、 衰减全反射傅里叶变换红外(ATR-FTIR)光谱和X射线衍射(XRD)等方法研究了膨化型柞蚕丝的内部形态和结构, 表征了其热性能和力学性能. 结果表明, 虽然经过了相应的膨化处理, 柞蚕丝素蛋白分子链仍表现出具有高度取向的反平行 $\beta$ -折叠构象, 而其单丝是由许多带状微纤沿纤维轴平行组装而成, 且具有较高力学性能的纤维.

关键词: 蚕丝; 形态; 取向; 构象; 力学性能

Interior Morphology and Structure of Expanded Tussah Silk Fiber

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Abstract:

The interior morphology and structure of the expanded tussah silk fiber were studied carefully by scanning electron microscopy(SEM) and with the help of Raman spectroscopy, attenuated total reflection-Fourier transform infrared(ATR-FTIR) spectroscopy and X-ray diffraction(XRD). Meanwhile, the thermal and mechanical properties of such kind of silk were also investigated. The results indicate that the molecular chain of silk protein in the expanded tussah silk fiber was highly oriented, in which the conformation was dominated by  $\beta$ -sheet. The well-performed silk fiber was made of many band-shaped micro-fibers aligned along its long axis.

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