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论文

PAN预氧丝环化程度的定量表征

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摘要:

应用恒温定长方法制备聚丙烯腈(PAN)预氧丝, 并测量该预氧丝长周期多层结构的小角X射线衍射谱. 解析图谱发现, 经不同预氧化时间所得预氧丝的长周期 L 均为11.7 nm; 当预氧时间从20 min增加到210 min, 预氧丝中环化结构相的体积分数 X_0/L 从7.9%增加到86.5%. 而应用广角X射线衍射法测得同批的预氧丝试样环化指数AI值则小很多. 因此, 用 X_0/L 定量表征预氧丝环化程度更为严格准确.

关键词: PAN预氧丝; 环化结构相; 环化相体积分数; 长周期X射线小角衍射

PAN-based Preoxidative Fiber Cyclized Degree of Strict Quantitative Characterization

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Abstract:

PAN-based preoxidative fiber was prepared under the conditions of constant temperature and fixed-length. Measurement of the preoxidative fiber needs the method of long-period multi-layer structure of small-angle X-ray scattering. Analysis of patterns show that long period L of the preoxidative fiber gotten by the different preoxidation time is average 11.7 nm; preoxidation time ranges from 20 min to 210 min, the volume fraction X_0/L of the cyclization phase volume fraction increases from 7.9% to 86.5%. However, AI values of cyclization index of the preoxidative fiber sample of the same batch, measured through the wide-angle X-ray scattering method, are much more smaller. It is more exact for using X_0/L to characterize the degree of cyclization of pre-oxygen wire quantitatively.

Keywords: PAN-based preoxidative fiber; Cyclization structure phase; Cyclization phase volume fraction; Long-period small-angle X-ray scattering

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