

Crystallinity of CVD-treated activated fibers at different temperatures

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1. 背景と研究目的

The crystallinity change of carbons with the temperature is important to understand their performance when used for catalysis, adsorption, electrical chemistry at high temperatures. In this work, the temperature dependent X-ray diffraction of carbons were studied using high resolution synchrotron X-ray diffraction (XRD) analysis.

2. 実験内容

The X-ray diffraction of four carbon materials, including activated carbon fibers (ACF-1, ACF-2) and CVD-treated activated carbon fibers (ACF-3, ACF-4) are measured at 298, 473, 673 and 853 K. The measurement for ACF-2 and ACF-3 is conducted on March 8th, and that for ACF-1 and ACF-4 is on 22nd, March.



Fig. 1 XRD patterns of activated carbon fiber (ACF-2) and CVD-treated activated carbon fiber (ACF-3).

3. 結果および考察

Figrue 1 shows the XRD patterns of of activated carbon fiber ACF-2 (a, b) and CVD-treated activated carbon fiber ACF-3 (c, d). All patterns have broad 002, 01 and 004 peaks, indicanting their non-crystalline structure. The 002 peaks of ACF-2 are ambiguous, suggesting the highly disordered structure of ACF-2. Increasing the measurement temperature gives rise to a slight left-shift of 002 peak of ACF-3, suggesting the spaces between the graphene layers of ACF-3 increase with the temperature.