



# Sulfur-encapsulation in carbon with different pore size

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## 1. 背景と研究目的

X-ray diffraction (XRD) analysis is a facile and useful method to determine the crystallinity of solid materials. We have prepared two dimensional confined nanospace (PG-box) and encapsulate sulfur into such nanospaces. It is of significant importance to investigate the structure of confined sulfur, which is different from its bulk state.

## 2. 実験内容

Sulfur was encapsulated in a series of porous carbon box with different pore width. The external sulfur was washed away with CS<sub>2</sub>. The X-ray diffraction pattern of sulfur encapsulated porous carbon (without box structure and washing) was studied for comparison. The XRD patterns of sulfur-contained porous carbon (boxes) was obtained in Aichi SR.

## 3. 結果および考察

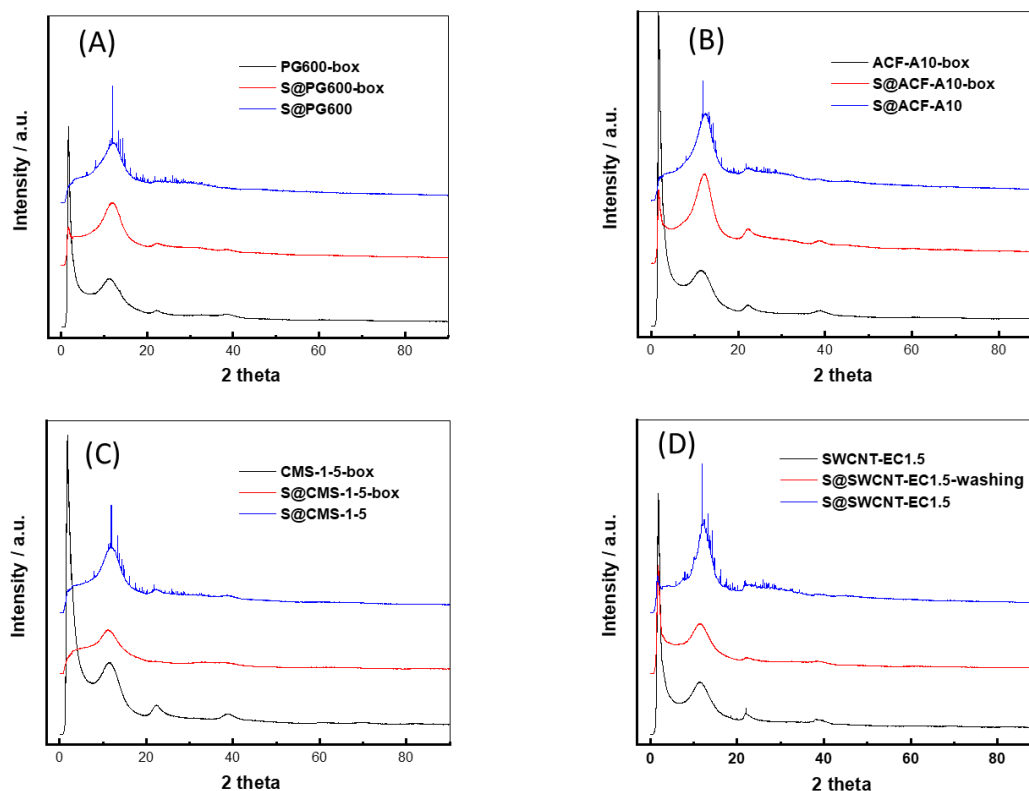


Fig. 1 XRD patterns of sulfur encapsulated in different porous carbons.

Figure 1 shows the XRD patterns of carbon-box, sulfur encapsulated carbon-box and sulfur encapsulated porous carbon (without washing). Sulfur-free carbon-boxes (black line) have broad 002, 01 and 004 peaks, indicating their non-crystalline structure. Sulfur confined in carbon-boxes (red line) doesn't give any extra peaks on XRD pattern, suggesting the confined sulfur is also in amorphous state. Sulfur loaded on porous carbon (blue line) show distinct diffraction peaks from sulfur, which should come from the small sulfur crystals on the external surface of carbons.