

O K X-Ray Absorption Spectra of Condensed Aromatic Compounds Having Various Oxygen Functional Groups

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Microporous carbon has been widely used for adsorbents and catalysts in many industrial fields. Its adsorption properties were thought likely to depend on the chemical states of the graphitic surface in the micropores. In order to analyze the oxidation states of the graphitic surface in microporous carbon, we measured O K x-ray absorption spectra of microporous carbon [1, 2] and condensed aromatic compounds having various oxygen functional groups such as -OH, -R-OH, -COOH, -C=O, -CH=O, and -C-O-C-. Total-electron-yield (TEY) x-ray absorption spectra of these compounds were measured in BL-6.3.2, and fluorescence-yield (FY) x-ray absorption spectrum of microporous carbon was in BL-8.0.1. Figure 1 shows the x-ray absorption spectra of the condensed aromatic compounds and microporous carbon in the O K regions. From the comparison in spectral features of microporous carbon with the condensed aromatic compounds, it can be suggested that -C=O or -COOH are the most probable chemical bonding states of oxygen in microporous carbon. Theoretical analysis of these x-ray absorption spectra is in progress to determine the chemical bonding states of oxygen on the graphitic surface in microporous carbon.

[1] Y. Muramatsu et al., Carbon (in press), [2] Y. Muramatsu et al., J. Electron Spectrosc. Relat. Phenom. (in press).

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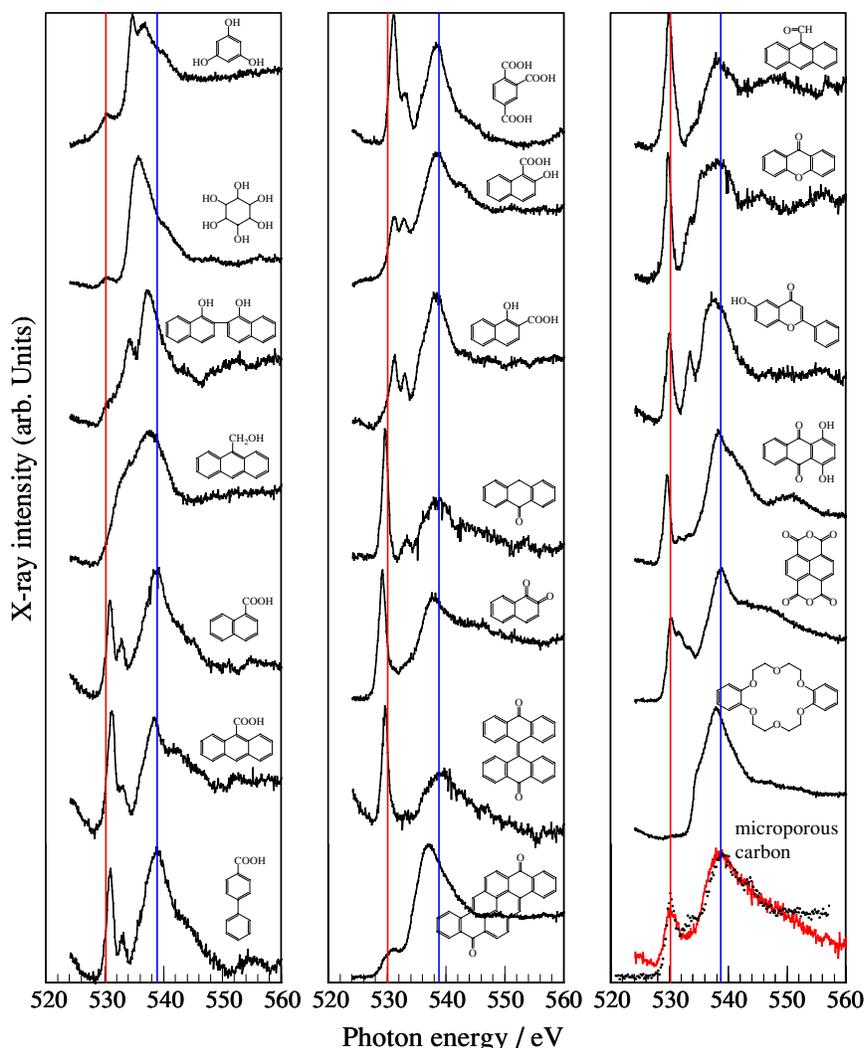


Figure 1. TEY x-ray absorption spectra of condensed aromatic compounds having various oxygen functional groups and microporous carbon. FY x-ray absorption spectrum of microporous carbon is shown by dotted line. Molecular structures of the condensed aromatic compounds are superimposed on the corresponding x-ray absorption spectra.