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Crystallographic analyses of carbon nanowalls using synchrotron X-ray HIROKI KONDO, WAKANA TAKEUCHI, MAKOTO SEKINE, MASARU HORI, Nagoya University, MINEO HIRAMATSU, Meijo University, ICHIRO HIROSAWA, OSAMI SAKATA, SHIGERU SAKATA, Synchrotron Radiation Research Institute (JASRI)/SPring-8 — Carbon nanowalls (CNWs) consist of stacked graphene sheets vertically-standing on substrates. In addition to high aspect ratio and large specific surface area, the CNWs are expected to have high carrier mobility and current carrying capability as well as the graphene sheets. Therefore, they are promising candidates as channel and electrode materials for the future functional devices. However, crystalline structures of CNWs have not been sufficiently clarified yet. In this study, we investigated the crystalline structures of CNWs using synchrotron X-ray. According to synchrotron X-ray diffraction (SR-XRD), it is confirmed that, with decreasing disorder components in graphene sheets, interlayer spacing between the stacked graphene sheets in the CNWs becomes closer to that of bulk graphite. On the other hand, grazing incidence X-ray scattering (GIXS) measurement results indicate 1.2-1.6 nm-sized scattering substance in the CNWs. These results suggest hierarchical nano-domain structures in the CNWs. Furthermore, theses experimental results suggest that the SR-XRD is useful to evaluate crystalline and domain structures of carbon nanomaterials such as the CNWs.

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