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Structure Control of Vertical Nanographene toward Electrochemical and Bio Applications MINEO HIRAMATSU, Meijo University, HIROKI KONDO, MASARU HORI, Nagoya University — Carbon nanowalls (CNWs) as platform based on vertical nanographene with large surface area offer great promise for providing emerging applications such as nanostructured electrodes for electrochemical sensing, biosensing, energy conversion, and scaffold for cell culturing. CNWs are composed of few-layer graphene standing almost vertically on the substrate, forming a self-supported network of maze-like wall structures. From a practical viewpoint, the structures of CNWs including spacing between adjacent nanowalls, nanowall height, thickness of individual nanowall, crystallinity and alignment should be controlled according to the usage of CNWs. The morphologies of CNWs depend on source gases, pressure, process temperature as well as the type of plasma used for the growth. In this study, CNWs were synthesized using inductively coupled plasma (ICP) employing methane/hydrogen/argon system.We investigated systematically the effects of ions incident upon the substrate, radical flow, and catalytic metals on the change of CNW morphologies. We report the current status of the control of CNW structures by the control of ions and radicals during the growth process as well as nucleation control, together with examples of electrochemical applications using CNWs.

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