Abstract Submitted
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Controlled synthesis and electrocatalytic characteristics of Pt nanoparticles-supported nanographene synthesized by in-liquid plasma HIROKI KONDO, TOMOKI AMANO, KENJI ISHIKAWA, MAKOTO SEKINE, MASARU HORI, Nagoya University, MINEO HIRAMATSU, Meijo University, NAGOYA UNIVERSITY TEAM, MEIJO UNIVERSITY COLLABORATION — We investigated a high-speed synthesis of high-crystallinity nanographenes over 1 micro-gram/min using in-liquid plasma. In this study, nanographene materials with different crystallinity were synthesized using ethanol and 1-butanol. Pt nanoparticles were supported on their surfaces reducing 8 wt%-H_2PtCl_6 in H_2O. G-band and D-band peaks in Raman spectra indicated nanographene materials. Nanographene materials synthesized using ethanol have higher crystallinity than those synthesized using 1-butanol. According to X-ray diffraction patterns, sizes of Pt nanoparticles are almost similar regardless of alcohol types. In cyclic voltammetry characteristics, peaks related to adsorption and desorption of hydrogen were clearly found in the both cases. The platinum effective areas were estimated to be 208.5 and 147.63 m^2/g for the cases using ethanol and 1-butanol, respectively. In addition, after potential cycling tests, nanographene materials synthesized using ethanol show almost no degradation, while those using 1-butanol show a drastic degradation. These results indicate that the higher-density Pt nanoparticles can be supported on the higher-crystallinity nanographene material and they show higher durability.

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