

Segmented graphite nano fibers supported catalysts for direct methanol fuel cell

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Carbon is an ideal material for supporting nanosized metallic particles in the electrode for low temperature fuel cells, such as polymer electrolyte membrane fuel cells. No other materials except carbon material have the essential properties of electronic conductivity, corrosion resistance, surface properties, and the low cost required for the commercialization of fuel cells. The performance and stability of low temperature fuel cells such as DMFCs are known to be strongly dependent on the carbon support used, as well as the catalytically active species. Accordingly, it is important that a suitable carbon material for use as a catalyst support for DMFC systems need to be developed. The unique properties of graphite nano fiber (GNF) have generated intense interest in the application of catalysts support. Baker et al. and Luke et al. demonstrated that GNF supported catalysts showed the improved activity when compared to Vulcan XC-72 supported catalysts.

Segmented graphite nano fibers (SGNF) are the modified GNF. Transmission electron microscopy indicates that SGNF looks like a linear array of lens-like segments with nearly equal separation, which consist of well-ordered graphite platelets intermittently stacked perpendicularly to the fiber axis. The 60 wt% PtRu (1:1) loading on Vulcan XC-72 and SGNF were obtained with the conventional borohydride reduction method. Then the supporting effects of SGNF were characterized. The structural and electrochemical characteristics of supported catalysts were performed by XRD, FETEM and cyclic voltammetry. The relation between the electrocatalytic activity and structure of supporting materials will be discussed in the Meeting.

References

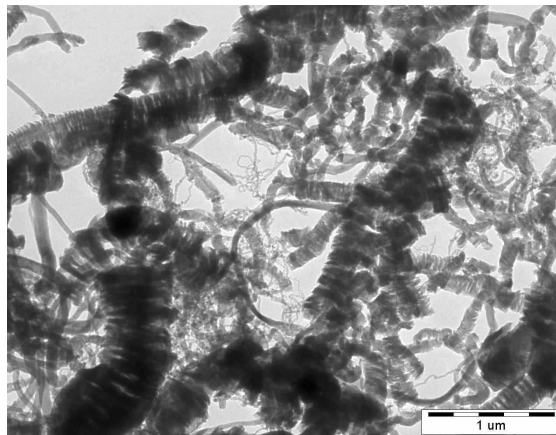
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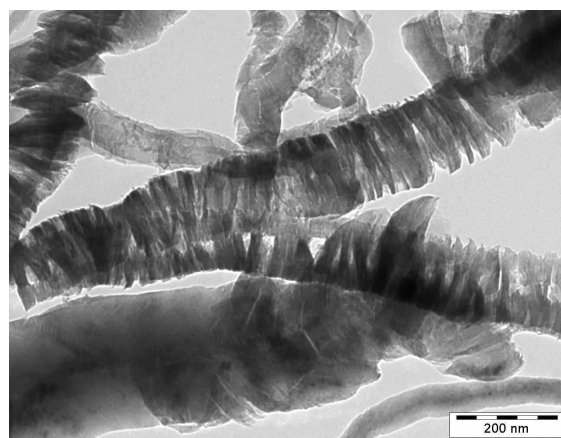
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(a)



(b)

Figure 1. FETEM images of segmented graphite nano fibers.