

Electrochemical Properties of Carbon Nano Fiber as Negative Material in Capacitor

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Electrochemical capacitor has been applied to electrochemical fields such as electrical vehicles to support lithium ion battery due to their high power density, long cycle ability and good cycle efficiency. Carbon materials such as activated carbons, carbon nano tube, graphite and carbon nano fiber have been widely studied for use as electrode materials of electrical capacitor because of their accessibility, easy processibility, relatively low cost, chemical stability and electrical and thermal conductivity in different solutions and wide temperature range. [1]

The aluminum template was prepared by anodizing and the experimental conditions for preparing the anodizing are summarized in Table 1.

Table 1 Experimental conditions for preparing anodizing.

Anodizing		Heating process	
Material	Aluminum (99.99%)	Temperature	600°C
Electrolyte	Oxalic acid solution (0.3mol)		800°C
Time	1 hour		1000°C
Temperature	18°C	Time	1 hour
Voltage	40V		

The aluminum plate used as working electrode and also non-anodized aluminum foil used as a counter electrode. After anodizing, the anodized aluminum plate(AAP) was soaked into 2 mol of phosphoric acid to remove oxide layer of AAP. The reason of anodizing process was repeated two times is to form more aligned oxide layer[2].

Poly ethylene glycol(PEO) was putted on AAP surface and heated in nitrogen at 600°C for 1 hour.

The heated templates were dissolved in 10wt% NaOH solution and we could obtain the hollow type carbon nano fiber(shown fig.1).

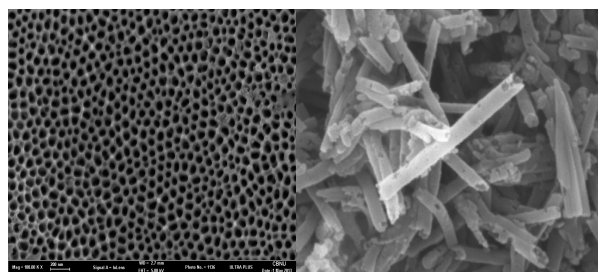


Fig 1 Scanning electron microscope images of anodized aluminum plate and hollow type carbon nano fibers from AAP.

In this study, we fabricated hollow type carbon nano fiber by liquid phase carbonization in porous anodic alumina template. The porous anodic alumina template have been examined using scanning electron microscopy (SEM) to confirm the porosity of anodic alumina template. Furthermore we measured the electrochemical characteristics of hollow carbon nano fiber for electrode of capacitor.

Reference

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