

Since polyvinyl alcohol (PVA) is a water-soluble polymer, it is relatively easy to form the mixture of PVA-solution and the other water-soluble solutes. Therefore, PVA is attracting attention as a carbon fiber precursor. PVA is almost decomposed by the release of volatile matters during heat treatment, so its yield is extremely low. Since PVA melts above 200 °C, the shape of the PVA material easily disappears. On the other hand, PVA-based carbon fibers can be produced by heat treatment in iodine vapor while keeping the fiber shape in high yield. However, the strong corrosiveness of iodine vapor causes operational difficulties. Therefore, in this study, we prepared PVA nanofibers from a mixture of PVA solutions containing alkali metal halides and tried to prepare carbon nanofibers (CNFs) without iodine vapor treatment.

The diameters of the PVA nanofibers obtained by the electrospinning method are about 300nm estimated by scanning electron microscopy (SEM) images. When the PVA nanofibers were heat-treated up to 800°C, the yield of about 34% was obtained. Hence, it is considered that the PVA nanofibers contained alkali metal halide were treated in the same chemical reaction as the iodine vapor treatment, and were stabilized by the crosslinking reaction of PVA molecules. The electrochemical properties of PVA-based CNF were evaluated as the electrode materials of an electric double layer capacitor.