

Preparation of Fibers from Phenolated Wheat Straw

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Abstract

Carbon fiber has commonly been produced from various fiber precursors, rayon, petroleum or coal pitch, PAN, commercial phenol formaldehyde resin etc. Amongst them, PAN is the most efficient precursor for preparation of carbon fiber. However, due to its higher cost many researchers have intensively studied to find out the best replacement for it. Therefore, many researchers believed that reproducible natural materials must be utilized as resources for the chemical industry instead of fossil resources. The utilization of biomass resources will be an important hot issue, and many techniques are currently being developed in order to use biomass resources effectively.



Fig.1. Phenolated wheat straw

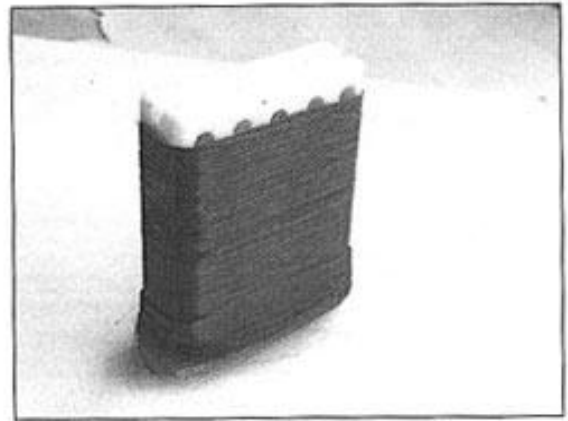


Fig. 2. Appearance of spun PWS fiber

However, a few researches have been done to prepare fibers for high performance composites such as carbon fibers and nanostructure fibers by using phenolated biomass such as wood and starch. Particularly, no studies have been done on the preparation of fiber from phenolated wheat straw biomass (Fig.1.)

In this study, phenolated wheat straw fiber (PWSF; Fig. 2.), as carbon fiber precursors, was prepared by curing, melt-spinning and stabilizing of phenolated/liquefied wheat straw. Besides liquefaction of wheat straw, the structural evolution and thermal property of the PWSFs were investigated. The results indicated that carbon fiber precursor could successfully be prepared from phenolated wheat straw

Keywords: Wheat straw, phenolation, carbon precursor, carbon fiber