

PROJECT FACTS

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COST SHARING

DoE-CPCPC \$57,541
CAER \$58,388

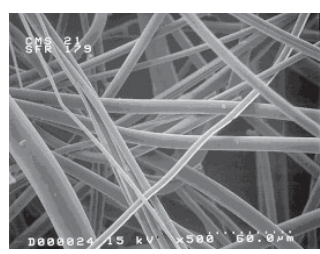
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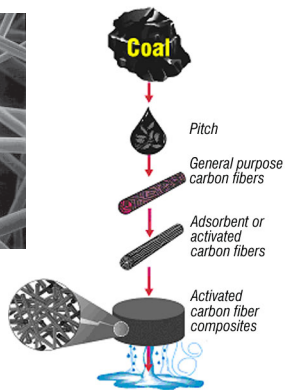
PRODUCTION OF BULK CARBON FIBERS VIA CENTRIFUGAL MELT SPINNING (CMS)

One of the fastest growing markets for carbon products is in environmental applications, where enormous interest has been generated by ecological awareness and regulations. In this respect, the materials of interest are predominantly activated carbons. Activated carbons can be produced with a wide range of properties and physical forms for use in numerous applications. For example, their high internal surface area and pore volume makes them ideal for applications where they are employed as adsorbents, catalysts, or catalyst supports in gas and liquid phase processes for purification and chemical recovery. Activated carbon fibers have a significant hold on a proportion of this market, but are somewhat limited in their market penetration due to the higher production costs compared with granular activated carbons. However, the advent of low cost fabrication techniques could substantially increase their market share since the performance of the carbon fibers in many applications is generally superior to that of packed granular carbon beds. Low cost fabrication methods allied to inexpensive coal derived feedstocks is a possible way that this could be achieved.

The carbon fibers for this market are produced from coal-derived isotropic pitches. To achieve acceptable fiber fabrication performance the solids present in raw pitches are usually removed (large particles >50µm or an accumulation of smaller ones can block the fabrication spinneret and inhibit flow). This is particularly important for melt spun or melt blown fiber. In contrast, a Centrifugal Melt Spinning (CMS) process under development at the University of Kentucky's Center for Applied Energy Research is capable of producing fibers from feedstocks containing significant quantities of solids, offering the potential for utilizing low cost coal derived feedstocks and reduced processing economics. Furthermore, regardless of the purity of the pitch feedstock, the high throughput of the CMS process makes it eminently suitable for producing large quantities of material for bulk fiber applications. There is considerable scope for further refinement of the CMS process to make it a viable and economic method of producing carbon fibers and activated carbon fibers from coal derived feedstocks to challenge the existing market leaders.



SEM Micrograph of CMS Carbon Fiber



CMS Carbon Fiber Mat

