

Carbon fiber precursor development at CSIRO

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It is widely known that the production of polyacrylonitrile (PAN) fiber from the acrylonitrile raw material has a major impact on the final properties of carbon fiber. In a market dominated by a few major carbon fiber manufacturers, smaller or innovative companies, especially those in emerging industries, have difficulty identifying and securing carbon fiber with the property and performance specifications to suit their needs. Using RAFT polymerization technology, varying grades and performance specification of carbon fibers can be produced by tailoring the chemistry and processing parameters of the PAN fiber to create carbon fibers with targeted properties for the end use application.

The objective of the work at CSIRO is to demonstrate that the technology can be scaled up to produce carbon fibers to specifications and quantify the benefits and advantages of using RAFT derived materials compared to conventional materials.

To achieve this the RAFT-PAN polymer needs to be converted into PAN fiber and subsequently converted to carbon fiber. CSIRO has utilised its existing expertise in polymer development but the missing link has been the capability to process the polymer into high quality polymer fiber that can then be carbonised. To solve this capability gap CSIRO and Deakin University have jointly funded a wet spinning line for the production (at research scale) of PAN fiber. A level of expertise in PAN fiber production has been built so that the benefits of the RAFT-PAN technology can be assessed and quantified. Once PAN fiber can be produced of a certain quality a comparison between carbon fiber produced with RAFT-PAN and traditional PAN can be completed.