

ACRYLONITRILE PRODUCTION FROM BIOMASS FOR RENEWABLE CARBON FIBER APPLICATIONS

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Carbon fibers are key materials in critical energy applications including light-weighting of vehicles for improved fuel efficiency and enabling larger wind turbine designs for increased power generation. Carbon fibers are produced through heat treatment of polyacrylonitrile fibers. Today, the acrylonitrile monomer is made primarily via ammoxidation of propylene with ammonia. However, price fluctuations in the feedstocks and the energy-intensive processes used to make carbon fibers have resulted in low-volume and niche adoption of carbon fibers into automotive applications, motivating the drive towards carbon fibers produced cheaply and reliably from renewable biomass sources. This talk will describe efforts in the newly formed Renewable Carbon Fiber Consortium to pursue acrylonitrile production from biomass-derived sugars via hybrid biological and chemo-catalytic processes. In particular, bench-scale efforts in two separate process schemes will be described that proceed via biological production of propionic acid or 3-hydroxypropionic acid, followed by subsequent separation and catalytic conversion to acrylonitrile.