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Enzymatic polymerization - A new process for engineered polysaccharides

Polysaccharides are important biopolymers with a wide range of industrial and consumer product applications. Historically, structural polysaccharides such as cellulose have been the backbone of early material science for applications in fibers & nonwovens, films and early thermoplastics. DuPont Industrial Biosciences has been developing a new family of engineered polysaccharides ranging in molecular structure, polymer molecular weights, solubility, and architecture. The process used to produce these new materials is based on enzymatic polymerization of sucrose and offers the opportunity to design the polymer structure and the material properties of these new biomaterials. The enzymatic polymerization of the homogeneously dissolved monomer sucrose in aqueous conditions allows for the controlled design and access of polysaccharide materials in the water phase which generates nano-scale primary particles which aggregate to micron scale high surface area structures. The colloidal characteristics of these new materials will be discussed and especially with relevance to applications in various end use markets. This presentation will introduce first examples of this new class of biomaterials along with first application examples.

Biography

Natnael Behabtu is a Chemical Engineer with expertise in mathematical modeling and experimental work. During my graduate studies (PhD), I worked on characterizing complex fluids and nano-scale materials. Additionally, I coordinated the collaboration effort between Rice University, Technion University (Israel), Wright Patterson Lab (US) and Teijin Twaron R&D (NL). This effort led to process development of a 100% carbon nanotube fiber spun from super acids solutions with multiple patent applications and peer reviewed publications. I am currently a Principal Investigator within DuPont CR&D - Chemical Sciences. The common themes of my assignments are process and product development of renewably-sourced materials.

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