



ADVANCED GREEN COMPOSITES: NEW DIRECTIONS

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Abstract: While advanced green composites with high strength, stiffness and toughness have been made and could be reality in the near future, significant research is currently going on in developing green composites with special characteristics such as self-healing, fire resistance, toughness, transparency and others. These composites are considered to be 'advanced' in terms of their respective characteristics. This presentation will briefly introduce the development of advanced green composites with high strength and toughness made using starch and soy protein (SP) and starch based resins and liquid crystalline cellulose (LCC) fibers. With 65% LCC fibers these green composites can have strength of over 1 GPa. Possibilities of using bacterial cellulose for high strength composites will also be discussed. The presentation will also describe two other types of advanced green composites, namely, fire-resistant green composites and self-healing green composites. SP is inherently fire retardant and adding halloysite nanotubes (HNTs) show significant improvement in its fire performance. Microcapsule based self-healing of SP and starch based resins and composites has also been possible and will also be discussed.