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One -pot approach synthesizing and characterization of random copolymerization of ethyl acrylate - co -methyl methacrylate with broad range of glass transition temperature onto collagen

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In Biotic material like collagen it is essential to modify their properties to desired conditions for specific end uses. To date the most of compatible surface modifications with spinning methods have been used as a simple post treatment with the aim of reducing the hydrophilicity of collagen that can extremely affect the quality of final product. For instance, the chemical crosslinking agents have been commonly applied to protect the desired morphology which are more likely to be non-uniformly crosslinked that may make it unable to meet the proper mechanical properties while they apply in non-stable humidity conditions and on the other hand the most crosslinking agents significantly increase the transition glass temperature. In material science, the polymeric materials are attractive due to their diverse possible variations in the ratio of the initial monomer(s) synthesis method etc. to provide the engineered materials with specific properties. The novelty of this work is determined to achieve the new copolymer onto the backbone of collagen to be processed through a spinning method in which the sufficient chain entanglements improve the flexibility of final product. Grafting polymerization of Ethyl Acrylate-co-methyl methacrylate was applied to modify the surface of the acid soluble collagen (ASC). This method was not only reduced the hydrophilic behavior of collagen but also successfully showed that the co -monomers can altered the thermal behavior of the resulted copolymer to achieve a thermally stabled product. The level of branched copolymer significantly influenced the initial viscosity in studied range of feed ratio of co -monomer whereas the long chain branching can be applied in high performance applications and short chain branching can influence the thermal behavior. The meaningful change in conductivity value of branched copolymer was observed where the acrylate polymer in side chain with the low dielectric constant covalently bonded onto the ASC.

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