

Abstract Submitted
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A new class of bio-heat resisted polymer blend. SEONGCHAN PACK, TAKASHI KASHIWAGI , TADANORI KOGA , MIRIAM RAFAILOVICH — Increasing in oil prices and environmental concerns is a driving force to seek out alternative materials. A completely biodegradable starch is a candidate for the alternative materials. Since the starch is brittle, it must be mixed with other polymers. In order to make a thermoplastic starch (TPS), we need a bio-compatibilizer to increase a degree of compatibilization. The biocompatibilizer can be a small molecules or nanoparticles with the small molecules, which leads to improved material properties. In order to demonstrate a possible biocompatibilizer, we first developed a corn-based starch impregnated with non-halogenated flame retardant formulations. The starch was blended with Ecoflex®, a biodegradable polymer. Using SAXS and USAXS we characterized structures of the compounds with different amount of Ecoflex® by weight. Furthermore, the addition of 5% nanoparticles in the compounds increased the Young's Modulus and impact toughness significantly. The compounds also did flame test. It is indicated that the compound with the addition of the nanoparticles would pass with a UL-94V0 rating. Therefore, the procedure for producing these TPS compounds can be applied to any biodegradable polymers, manufacturing a new bio-heat resisted compound.

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