

## **Polystyrene/TiO<sub>2</sub> composite electrospun fibers as fillers for poly(butylene succinate-co-adipate): Structure, morphology and properties**

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### **Abstract**

In this work, composite polystyrene/titanium dioxide (PS/TiO<sub>2</sub>) electrospun fibers were used as a reinforcement for a poly(butylene succinate-co-adipate) (PBSA) matrix. The structure, morphology, mechanical properties and degradation behavior of such materials were investigated, finding that, as a function of their TiO<sub>2</sub> content, the fibers exerted different effects. The main mechanism through which the fibers modified the structure and morphology of the polymer matrix is by altering its crystallization kinetics. The presence of TiO<sub>2</sub> modified the roughness of the fibers and therefore affected the interfacial adhesion between the filler and the matrix. The modulus of PBSA was improved, even though the brittleness of the materials was increased by the presence of the fibers. Different amounts of TiO<sub>2</sub> within the fibers allowed to tune the hydrolytic degradation rate of the composites. This paper shows the potential of using composite electrospun fibers as effective fillers for the preparation of polymer-based composites.