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Mechanical properties of poly (butylene succinate) composites with aligned cellulose-acetate nanofibers.[1] TOMOKI MAEDA, SHUNTA KIMURA, NARUKI KUROKAWA, ATSUSHI HOTTA, Department of Mechanical Engineering, Keio University — We have developed a polymer-based nanocomposite by blending polymer nanofibers into polymer matrixes for the enhancement of the mechanical properties. In this work, we fabricated an anisotropic polymer-based nanocomposite by regulating the alignment of the nanofibers. In detail, poly (butylene succinate) (PBS), one of the most promising biodegradable polymers, was mixed with aligned cellulose acetate (CA) nanofibers made by electrospinning. CA was originally obtained as natural polymers. The aligned CA nanofibers with an average diameter of 490 nm were synthesized using a drum collector rotating at 7 m/s during the electrospinning. The PBS composites with the aligned CA nanofibers were produced by the hot-press molding, where the concentration of the CA nanofibers was 20 wt%. It was found that adding aligned CA nanofibers to PBS matrix increased the Young's modulus up to 780 MPa, and that adding random CA nanofibers increased the Young's modulus up to 650 MPa. The Young's modulus of a neat PBS was 320 MPa. It was therefore confirmed that the mechanical property of PBS could be effectively improved by adding aligned nanofibers to fabricate anisotropic polymer-based nanocomposites.

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