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Synthesis of Healable Organic Semiconductor Through Dioxaborolane Bond

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ABSTRACT

The field of organic semiconductors have gained enormous attention the past few decades. Organic materials offer numerous advantages over their inorganic counterparts. Recently a number of works have demonstrated organic semiconductors with healable properties. We aim to investigate the healable ability of an organic semiconductor by mimicking a vitrimer system through the reversible dioxaborolane bond. Vitrimers are polymers with reversible crosslink system. It has been reported that the use of the borane-oxygen bond as the crosslink showed good mechanical performance. The electrical properties will be inspected for the vitrimer-like polymer. In this report we describe a Diketopyrrolopyrrole base polymer incorporating reversible dioxaborolane bonds synthesized through borane esterification. The electrical properties and the healing properties of the polymer will be investigated. Here, we present the progress of synthesizing to the monomer, and we report the trials for the reactions. The predicted result for the overall yield of the monomer is 30-40%.

KEYWORDS

Organic Semiconductors, Nanomaterials, Vitrimer, Healable material