Synthesis of heteroatomic thiazole-based copolymers for organic semiconductors

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The development of efficient and low-cost polymeric semiconductors is a longstanding scientific goal. Major research effort has been delegated to the design of polymeric materials with excellent electron transport properties and ambient stability for their potential applications in transistors, solar cells, consumer electronics, etc. In recent years, there has been particular interest in developing solution-processable n-type semiconductor compounds. Of these compounds, copolymerized thiazole-based heteroatomic polymers have recently shown impressive potential as active materials in organic electronics. These thiazole-based heteroatomic compounds are characterizedπ by their closely packed -π arrangement and rigid backbone structure. Herein, we will study the design and synthesis of different pyrrole thiazole-based ladder polymeric structures. We will report the chemical, optical, and mechanical properties of different alkyl branching of the thiazole-based core and different copolymerization structures. The polymers exhibited excellent solubility, broad absorption spectrum, and sufficient electrochemical and thermal stability. Furthermore, we investigate the copolymerization of fluorinated and non-fluorinated thiadiazole-based polymers. The fluorinated thiadiazole polymers are expected to show higher electron mobility and exhibit better photovoltaic performance. With such successful outcomes, the future of high-performance and ambient stable polymeric semiconductors remains promising and near.

Biography

Byanne Malluhi is an undergraduate Chemical Engineering student at Texas A&M University at Qatar.

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