The impact of [1,2,5]Chalcogenazolo[3,4-*f*]-Benzo[1,2,3]Triazole structure on the optoelectronic properties of a conjugated polymer

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The use of conjugated polymers as an active layer in electrochromic (EC) devices [1,2] and organic solar cells (OPVs) [3,4] became an outstanding research area in the latest century due to their ease of processability, fast switching time, high optical contrasts and changing color easily via structural modifications. Benzotriazole (BTz) has been extensively used as an acceptor moiety in donor-acceptor (D-A) type conjugated polymers in literature and results in low band gap polymers and low LUMO energy levels.[5] In this study, our aim is to incorporate chalcogenazole structure to benzotriazole which leads to enhanced optoelectronic properties of resulting polymers via its stronger acceptor character. Previous studies suggest that electronegativity and hypervalency of chalcogen enhances the acceptor properties of moiety.[6,7] Chalcogenazole based monomer is synthesized via Stille coupling using thiophene as a donor moiety. A branched alkyl chain is introduced to BTz to improve solubility of further polymers. As a future study, the corresponding monomer will be coupled with a suitable donor in order to obtain a low band gap D-A type conjugated polymer for organic photovoltaic applications.

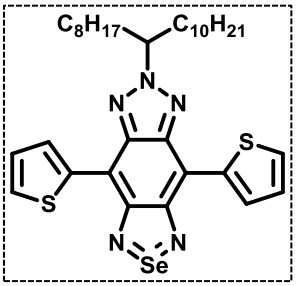

Figure 1: The structure of designed acceptor moiety

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