Poster Presentation

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Functionalizable organic-polymers: coordination polymers as templates for solid-state [2+2] reaction

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The quest for synthetic polymers is ever growing field given their potential uses in various day-to-day applications. The need for the fabrication of novel polymers demands new strategies in chemistry and material science for alternative raw materials which enable a controlled arrangement of monomers for polymerization reaction to lead to useful materials. A novel organic polymer containing cyclobutanes and amides as back bones and pyridyl groups as side arms has been synthesized by single-crystal-to-single-crystal (SCSC) [2+2] photopolymerization reaction in the coordination polymers (CPs) of diene. The diene molecule is photo inactive in its crystals and forms a triply intertwined one-dimensional helical CPs with Cd(NO3)2 and Cu(NO3)2 salts. The 1D-CPs is transformed in to coordination polymer of organic polymer (CPOPs) containing 3-fold interpenetrated 3D-networks of CdSO4 topology via [2+2] reaction in SCSC manner upon irradiation. The organic polymer was isolated from CPOPs and characterized by 1H NMR, 13C NMR, MALDI-TOF, GPC and XRPD. Further, it was found that the organic polymer is amenable for N-alkylation reactions such as methylation, propylation and decylation. The formate salt of organic polymer and methylated polymer were shown to form plastic films with combination of properties such as high transparency, tensile strengths, gas permeability, thermal stabilities, resistance for water and other organic solvents. The methylated polymer exhibited an ability to capture chromate ions and anionic dyes from aqueous solutions.

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