Singh, Y.; Jayaraman, N. 2016, "Multicolor reversible thermochromic properties of gallic acid-cored polydiacetylenes appended with poly(alkyl aryl ether) dendrons", *Macromol. Chem. Phys*., *217*, 940−950 (with Cover Page illustration).

Polydiacetylenes based one dimensional conjugated polymers arise a sustained interest among researchers across various fields, as a result of their manifold characteristic properties, primary among them is the temperature-induced color transition or chromoisomerism property. The color transitions are extremely sensitive, for which the side chain functionalities contribute directly, as the functionalities affect the conjugation lengths and geometry of the conjugated main chain. On the other hand, covalent linking of the polymerizable monomers with highly branched dendron moiety has provided a newer method to derive newer polymer structures and properties. Realizing that grafting dendrons on to the conjugated polymer backbone would directly affect the spatio-temporal properties of the polymer, we undertook a study of the dendron-appended polydiacetylenes. In the event, it is uncovered that appending the polymer with dendrons is a high-value approach in order to improve the thermo-chromic properties of the polymer. Primarily, the dendron appendage led the polymers to be exhibit a stable, robust nanoribbon crystallite morphology and the attendant changes in the thermochromic property improved significantly. Studies show that the thermochromic transition clearance temperatures can be increased to over 300 ^{o}C, without a loss of the stability of the polymer. Such an increase is hither-to unknown to polydiacetylene polymers at large. Synthesis and studies are performed with two generation of dendron moieties, in order to consolidate the structural and morphological changes responsible for the polymers to extend the thermochromic range to such very high temperatures. A number of techniques including UV-Vis, FT-IR, Raman, DSC, TGA, AFM, XRD and TEM are used to study the multicolour thermochromic property in a detailed manner. Further, the work extends to uncover photoluminescence behaviour of the polymers, with quantum yields the highest known so far for polydiacetylene polymers at large. Novelty of this work in comparison to those known so far in literature are: (i) dendron-appendage to polydiacetylene backbone and (ii) ability of such dendron-appended polydiacetylene virgin materials to exhibit multicolour, reversible transition up to 300 ^{o}C, which is hither-to unknown for a polydiacetylene derivative.