

Advanced Synthetic Avenues to Fluorescent Polymer-Based Networks for NMR Spectroscopy

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Our work comprises the synthesis of polymer-based alignment media for their application in NMR spectroscopy. The NMR analysis of biomolecules and natural products using alignment media allows determination of their conformation, configuration and relative stereochemistry.¹ The analysis of anisotropic interactions like residual dipolar couplings (RDCs)² gives access to this important structural information through long-range coupling assessment. Nevertheless, the current available media have the disadvantage of low resolution, lack of functionalization potential and little knowledge of relationship structure-properties. Our aim is to produce optimized alignment media for anisotropic NMR studies (Figure 1). The proposed strategy includes controlled RAFT polymerization of styrene to attain defined functional chains. The later cross-linking of the chains is done via Nitrile-Imine mediated Tetrazole-Ene Cycloaddition (NITEC) reaction, using UV-light.³ This pro-fluorescent reaction gives us a platform for characterization⁴ and will lead towards a better understanding of the phenomena related to the alignment process.

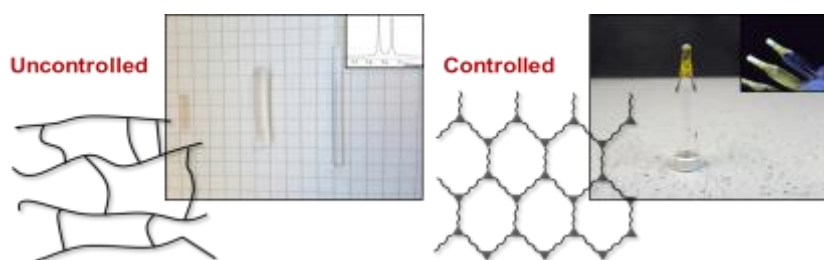


Figure 1: Uncontrolled free radical polymerization and cross-linking of styrene gives inhomogeneous networks that are used as NMR alignment media. The controlled RAFT polymerization and UV-induced crosslinking of defined chains yields more homogeneous and fluorescent polystyrene gels

References

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