

Title Deeper insight into the MADIX Polymerization of Vinylidene Fluoride

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Abstract

Though many studies deal with the controlled radical polymerization of styrene and acrylate monomers, a few works have been achieved on that of fluorinated monomers. Controlled radical polymerization protocols for vinylidene fluoride (VDF) are still very elusive. In contrast to the MADIX copolymerization of VDF with other comonomers, that of VDF has been very rarely reported. The synthesis of PVDF using MADIX solution polymerization was thus investigated in details. More efficient protocols of solution polymerization were developed and afforded relatively well-defined PVDF. The careful polymer chain-end monitoring using MALDI-TOF as well as ¹H, ¹⁹F, and HETCOR ¹H-¹⁹F NMR nonetheless revealed that VDF reverse additions and transfer to solvent reactions severely affect the control of the polymerization. Indeed, these unwanted reactions are responsible for a non-negligible loss of CTA and for the accumulation of non-reactive polymer chains in the reaction medium. These reactions lead to the synthesis of PVDF with high chain-end functionality, and attempts to reinitiate further chains have been explored to lead to original block copolymers and graft copolymers. This work is the first comprehensive study of the MADIX solution polymerization of VDF.

About the Speaker

Dr. Bruno Ameduri leads the “Fluoropolymers and Energy” team at the “Engineering and Macromolecular Architectures” Team of Institute Charles Gerhardt in Montpellier, France. His main interests focus on the synthesis and the characterization of fluorinated monomers (including cure site monomers and telechelics), telomers, and copolymers for various applications such as F-surfactants, elastomers, coatings, and polymers related to energy (fuel cell membranes, polymer gel electrolytes for Li-ions batteries and PV). Coauthor of one book, 36 reviews or chapters of books, more than 265 peer review publications and coinventor of more than 70 patents, he is also a member of the American and French Chemical Societies and is a member of the Editorial Boards of the *Journal of Fluorine Chemistry*, *European Polymer Journal*, *Polymer Bulletin*.

Host: Professor Atsushi Takahara

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