

Challenges in the successful synthesis of oligo(hexafluoropropylene oxide) perfluoroisopropenyl ether (PIPE)

Trevor. J. Burgess¹, Addison D. G. Pasiuk², Benson J. Jelier² and Chadron M. Friesen ^{1*}

¹Trinity Western University, Department of Chemistry, 7600 Glover Road, Langley, BC V2Y 1Y1

²Simon Fraser University, Dept. of Chemistry, 8888 University Drive, Burnaby BC, Canada V5A 1S6

E-mail: chad.friesen@twu.ca

Perfluoroisopropenyl esters have been well studied under radical conditions to copolymerize with vinyl ethers or generate polyadditions to sisesquioxanes, 1,4-dioxane, 1,3-dioxolane, tetrahydropyrans, etc. In our research, we wanted to explore the possibility of incorporating a perfluoroisopropenyl group onto a perfluoropolyalkylether (PFPAE) such as oligo(hexafluoropropylene oxide) in a minimized number of steps. It was found that a strict number of conditions were required to generate the desired perfluoroisopropenyl ether (PIPE) from primary iodides in yields greater than 80%. Our work also shows there are a number of other functional groups that can be generated by varying conditions slightly. It is our hope that this new macromonomer can be used for radical copolymerization or in systems that utilize photocuring techniques for surface protection. The scope and limitations of the method will be discussed.

