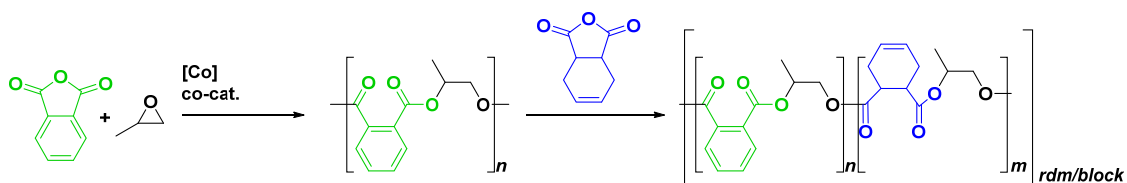


# Waste Free, Low Temperature Ring Opening Terpolymerizations to Modifiable Semi-Aliphatic Polyesters

Rudi Eswein, Kai C. Hultsch\*

Institute of Chemical Catalysis, Faculty of Chemistry,  
University of Vienna, Vienna, Austria

The synthesis of polyesters is one of the largest scaled production of plastics. To date still the majority of the polymerizations are conducted via an acid catalyzed polycondensation reaction of a carboxylic acid and an alcohol at high temperatures. [1] The largest process in this regard is the production of polyethylene terephthalate which is used in numerous applications from bottles to tires. Thus, it should be of mayor interest not only to improve or substitute already existing technologies but, also to drive the development further to create novel materials by using only abundant materials and feedstocks. Ring opening polymerizations can give access to similar polymeric structures as mentioned above [2]. Additionally, a great structural variety can be introduced to the resulting polymer by either changing the order of addition of the monomers or by post polymerization modification.



Scheme 1: Exemplary polymerization scheme.

In this context we present a waste free base–metal–catalyzed terpolymerization comprising low catalyst loading and mild conditions, leading to semialiphatic polyesters capable of post polymerization modifications. Furthermore, we present the tunability of material properties by catalyst induced stereocontrolled propylene oxide incorporation from a racemic mixture.

[1] Encyclopædia Britannica, inc., Major industrial polymers, <https://www.britannica.com/topic/industrial-polymers-468698/Polyesters> (accessed Mai 13, 2019).

[2] DiCiccio, A. M.; Longo, J. M.; Rodríguez-Calero, G. G.; Coates, G. W. J. Am. Chem. Soc. 2016, 138, 7107-7113.