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# New routes to difunctional macroglycols using ethylene carbonate: Reaction with bis-(2-hydroxyethyl) terephthalate and degradation of poly(ethylene terephthalate)

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<https://doi.org/10.1016/j.polymdegradstab.2017.08.018> 

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## Abstract

The degradation of poly(ethylene terephthalate) by ethylene carbonate with potassium hydroxide was studied. Model reactions were carried out to determine the chemical species produced. Ethylene carbonate reacted with potassium hydroxide to yield oligomers with a limited content of carbonate groups. Bis(2-hydroxyethyl) terephthalate condensed to PET oligomers without significant incorporation of ethylene carbonate in the chains when potassium hydroxide was not present and produced difunctional oligomers with hydroxyl terminal groups containing aromatic rings esterified with polyether short chains and some residual carbonate groups when potassium hydroxide was added. Poly(ethylene terephthalate) was converted into difunctional oligomers of approximately 1000–2000 g·mol<sup>-1</sup> molecular weight with short polyether chains connecting the terephthalate rings and a significant content of carbonate groups. The resulting oligomers could find application as polyols for the synthesis of polyurethanes.

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## Introduction