

Synthesis and characterization of novel poly(ethylene furanoate-co-ethylene vanillate) copolymers



¹Evangelia Mpalla, ¹Alexandra Zamboulis, ¹Lazaros Papadopoulos, ²Eleftheria Xanthopoulou
¹Zoi Terzopoulou, ¹Dimitrios N. Bikiaris, ²George Z. Papageorgiou
 [1] Department of Chemistry, Aristotle University of Thessaloniki, GR-541 24, Thessaloniki, Greece
 [2] Chemistry Department, University of Ioannina, P.O. Box 1186, GR-45110, Ioannina, Greece



Introduction

Sustainable polymers & Lignin

- Monomers based on renewable sources afford green polymers
- Lignin is the second most abundant natural polymer
- Source of aromatic monomers

Vanillic acid

- Produced by vanillin oxidation
- Biobased aromatic building block
- Poly(ethylene vanillate) has comparable thermal properties to PET

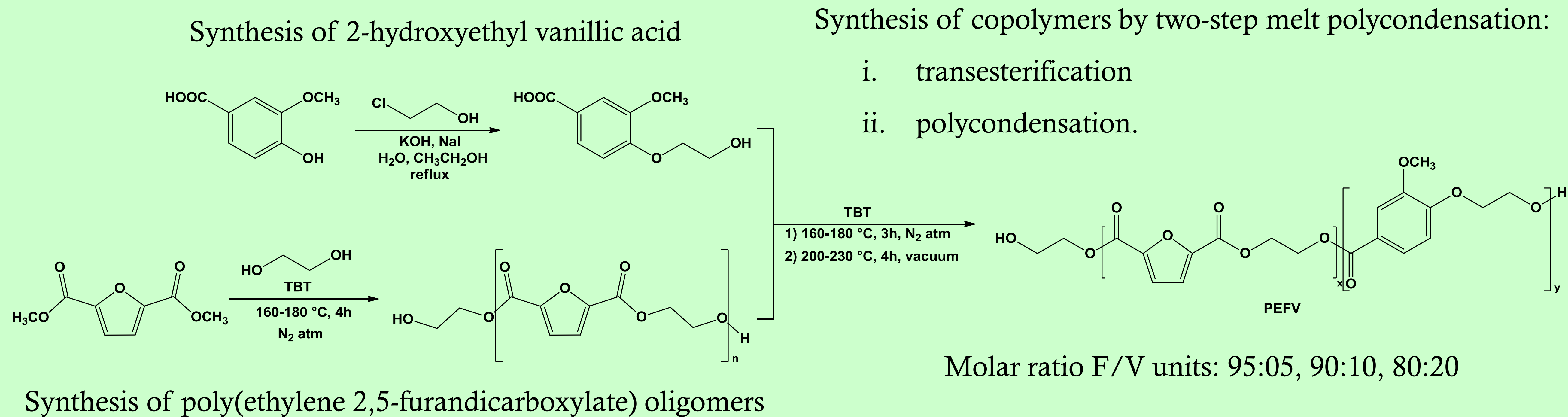
Poly(ethylene furanoate) (PEF)

- One of the most important biobased polymers
- Exceptional barrier properties (O₂ and CO₂)
- Superior thermal stability and lower melting temperature than PET

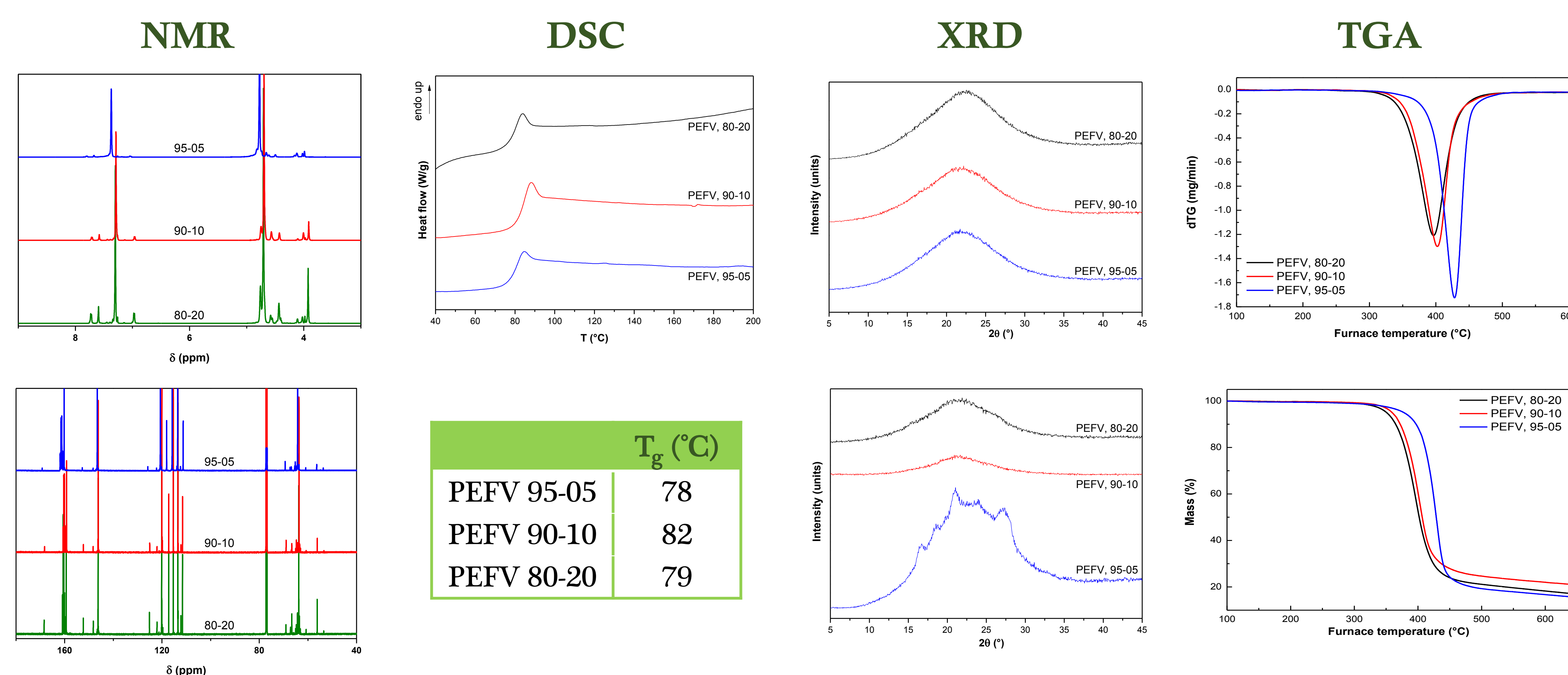
Our goals

- Prepare poly(ethylene furanoate)/poly(ethylene vanillate) copolymers (PEFV)
- Study the thermal behavior and stability

Synthesis



Results



- NMR analysis confirms the successful synthesis and points to block copolymers.
- Copolymers were initially amorphous, but upon annealing (1h, 100 °C) crystallinity increases.
- Crystallinity decreases with increasing vanillic content.
- Thermal stability decreases with increasing vanillic content.

Conclusions

- ✓ PEFV block copolymers were successfully synthesized.
- ✓ Composition is consistent with the feed ratio.
- ✓ As received samples were completely amorphous.
- ✓ T_g temperatures range around 80 °C.



azamboulis@gmail.com
 dbic@chem.auth.gr

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