Supplementary information

Degradable Polyester Ternary Blends: Composition and Hybrid Compatibilization for Flexible Packaging

Matias Menossi[1,2,$], Manushri Gunasekaran[1,2,$], Ehsan Pesaranhajiabbas[1,2], Amar K. Mohanty[1,2,*], Manjusri Misra[1,2,*]

[1]Bioproducts Discovery and Development Centre, Department of Plant Agriculture, Crop Science Building, University of Guelph, Guelph, N1G 2W1 Ontario, Canada

[2]College of Engineering, Department of Interdisciplinary Engineering, Thornborough Building, University of Guelph, Guelph, N1G 2W1 Ontario, Canada

Corresponding Authors:

*Manjusri Misra; Email: mmisra@uoguelph.ca; ORCID: 0000-0003-2179-7699.

*Amar K. Mohanty; Email: mohanty@uoguelph.ca; ORCID: 0000-0002-1079-2481.

Matias Menossi; email: mmenossi@uoguelph.ca; ORCID: 0000-0002-6519-3152.

Ehsan Pesaranhajiabbas; email: pesarane@uoguelph.ca

Manushri Gunasekeran; email: manusmriti99@gmail.com

[$]These authors contributed equally to this work.

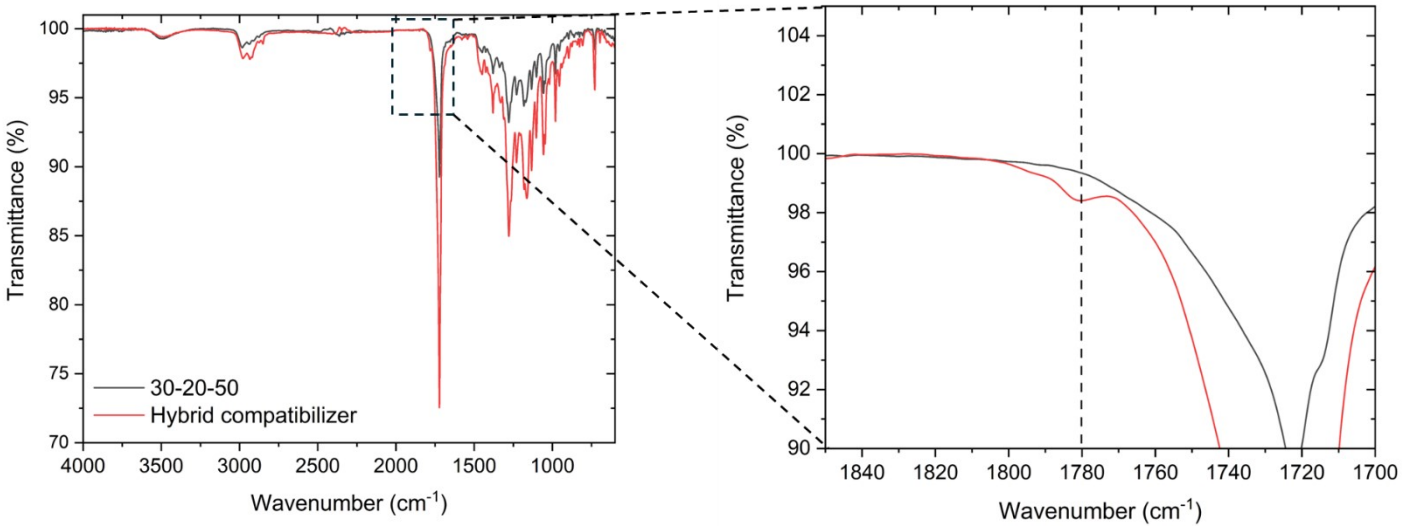

Figure S.1. FTIR spectra of sample 30-20-50, and the purified hybrid comaptibilizer with highlighted simples in the range of 1850 to 1700 cm^{-1}. The samples were identified as BioPBS-PBAT-PHBV-compatibilizer.

Table S.1. Surface tension (γ) and the polar (γ^p) and dispersive (γ^d) components (mN/m) for water and diiodomethane.

Liquid	γ	γ^p	γ^d
Water	72.8	51.0	21.8
Diiodomethane	50.8	0.0	50.8

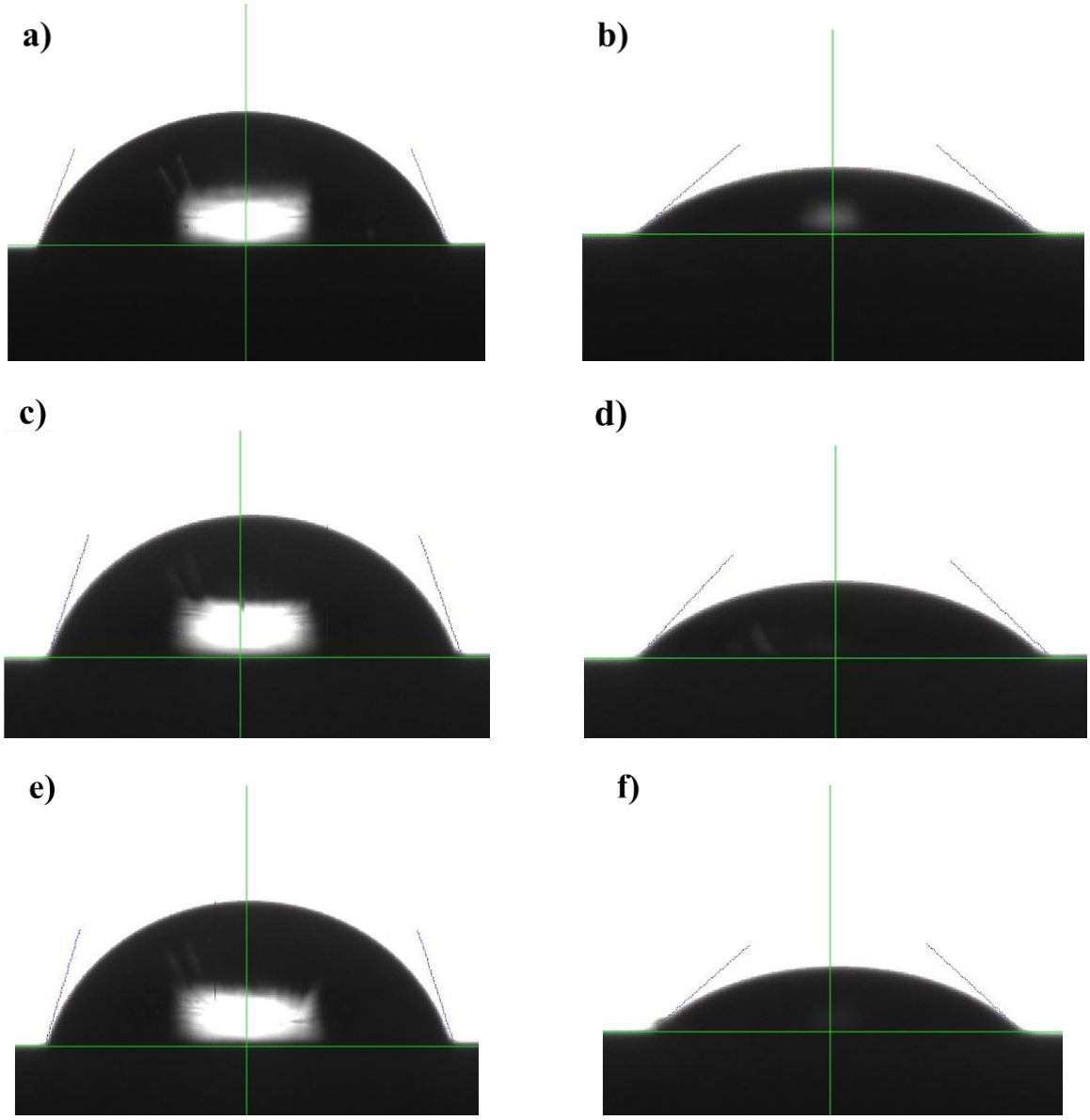

Figure S.2. Water contact angle of neat biodegradable polymers, a) neat PHBV, c) BioPBS, and e) PBAT. Diiodomethane contact angle of neat biodegradable polymers, b) neat PHBV, d) BioPBS, and f) PBAT.

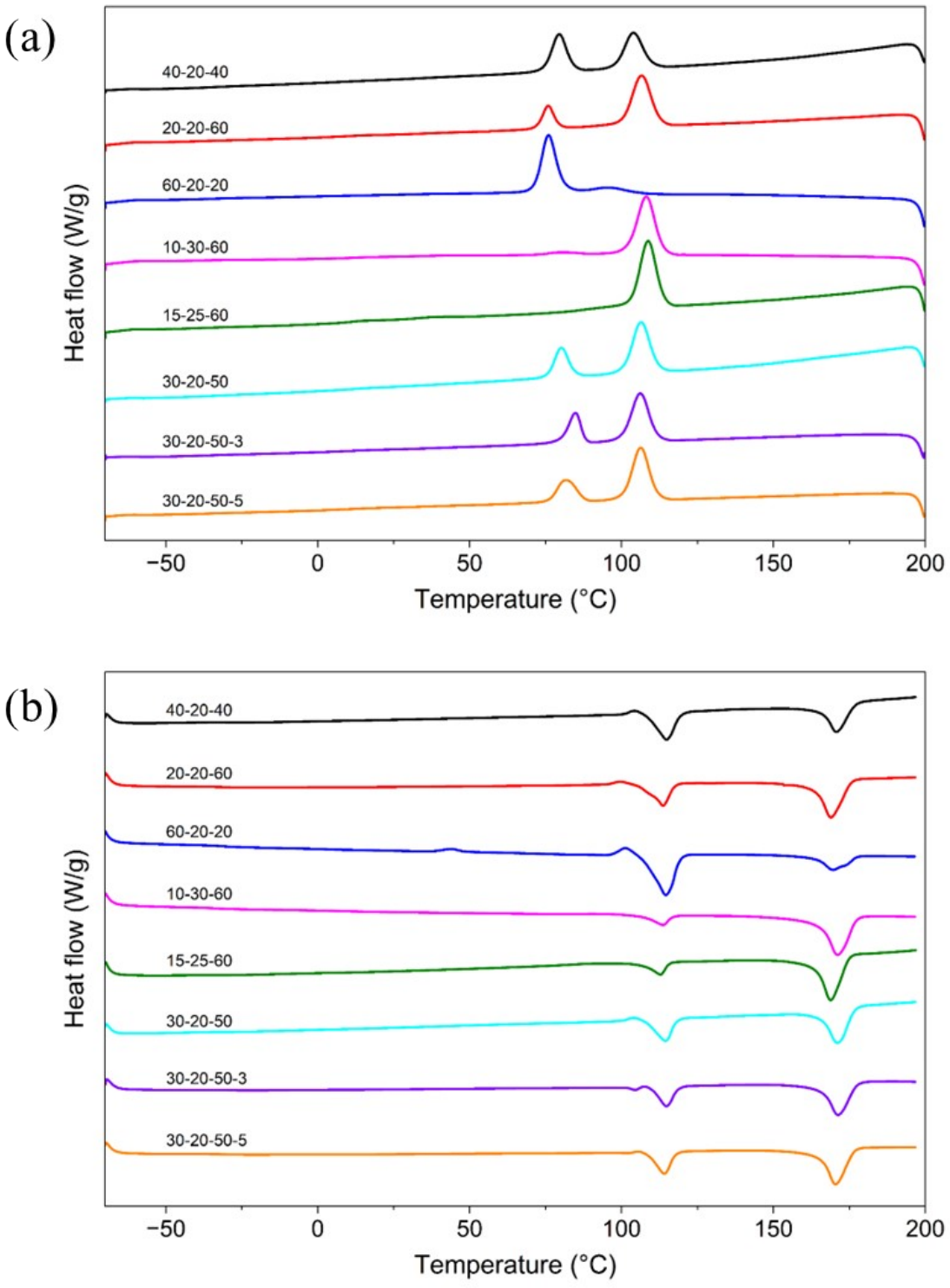

Figure S.3. DSC results for the ternary blends and neat polymers. A) Second heating cycle with labeled melting temperatures and the glass transition temperature; B) first cooling cycle with labeled crystallization temperature. The samples were identified as BioPBS-PBAT-PHBV-compatibilizer.

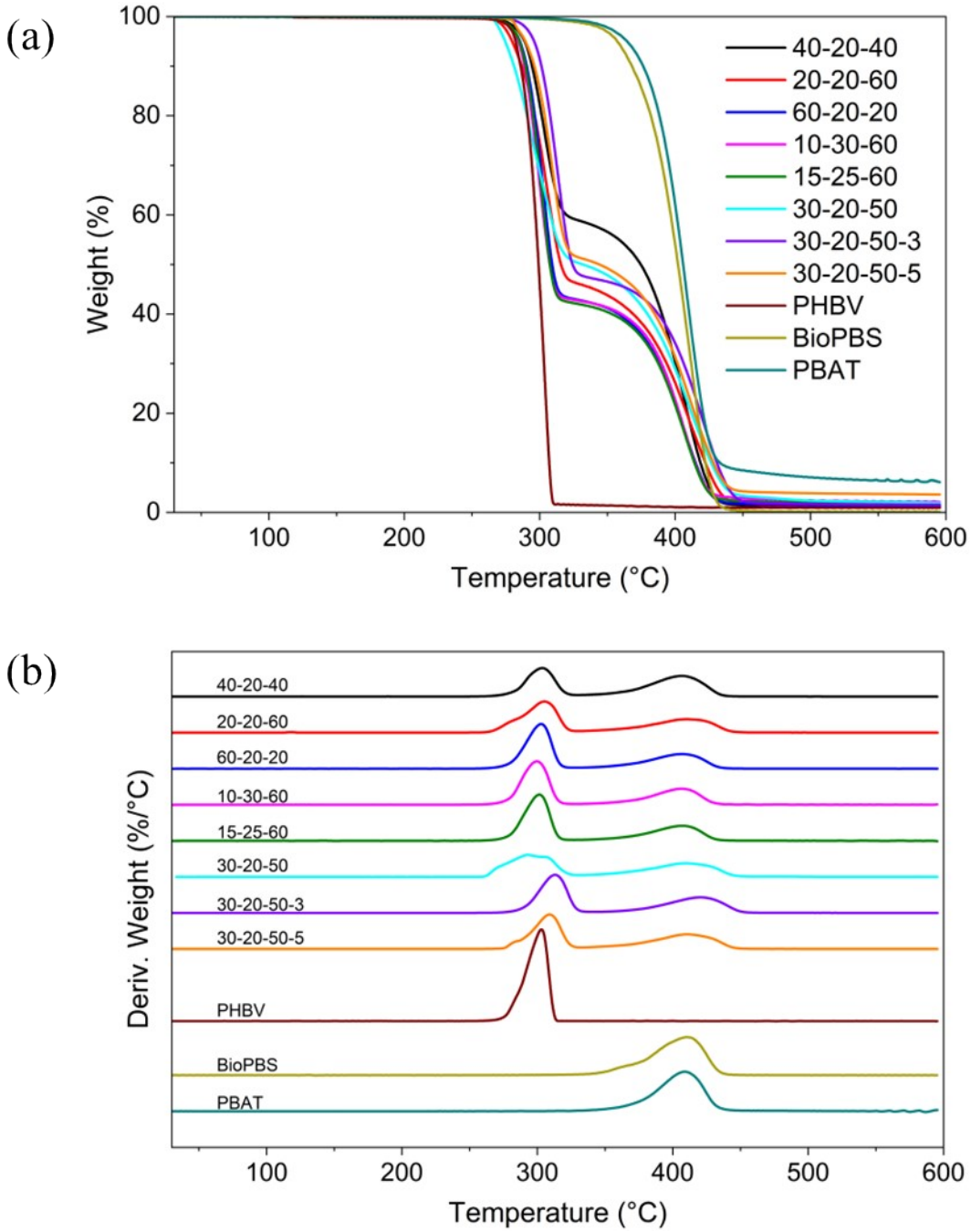

Figure S.4. Thermogravimetric Analysis (TGA) results. a) weight change as a function of temperature, and b) derivative weight change as a function of temperature for the ternary blends and neat polymers. The samples were identified as BioPBS-PBAT-PHBV-compatibilizer.

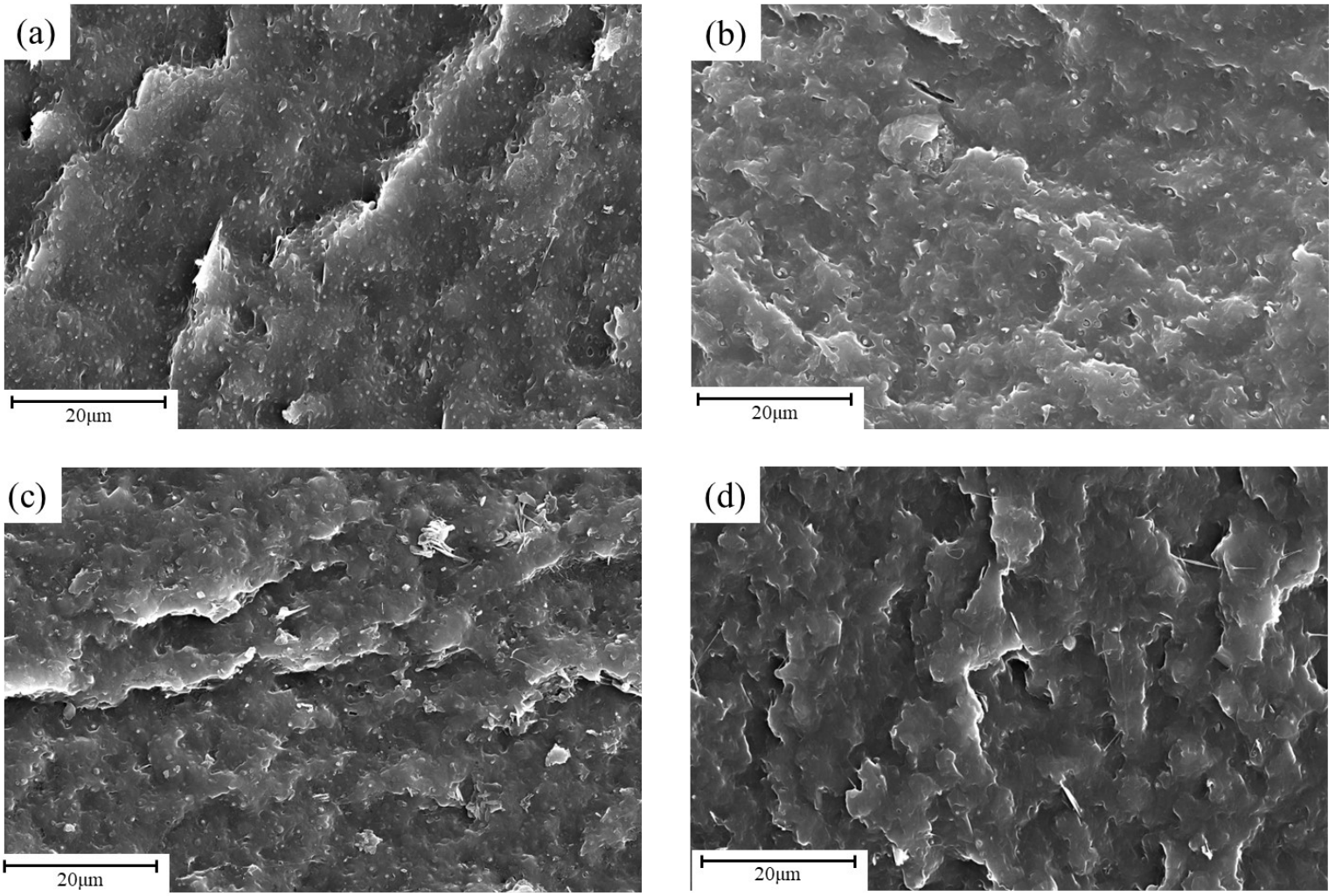

Figure S.5. Scanning Electron Microscopy Images of (a) Sample 10-30-60, (b) Sample 15-25-60, (c) Sample 60-20-20, (d) Sample 30-20-50-5. Magnification used in this work is 5000×. The samples were identified as BioPBS-PBAT-PHBV-compatibilizer.

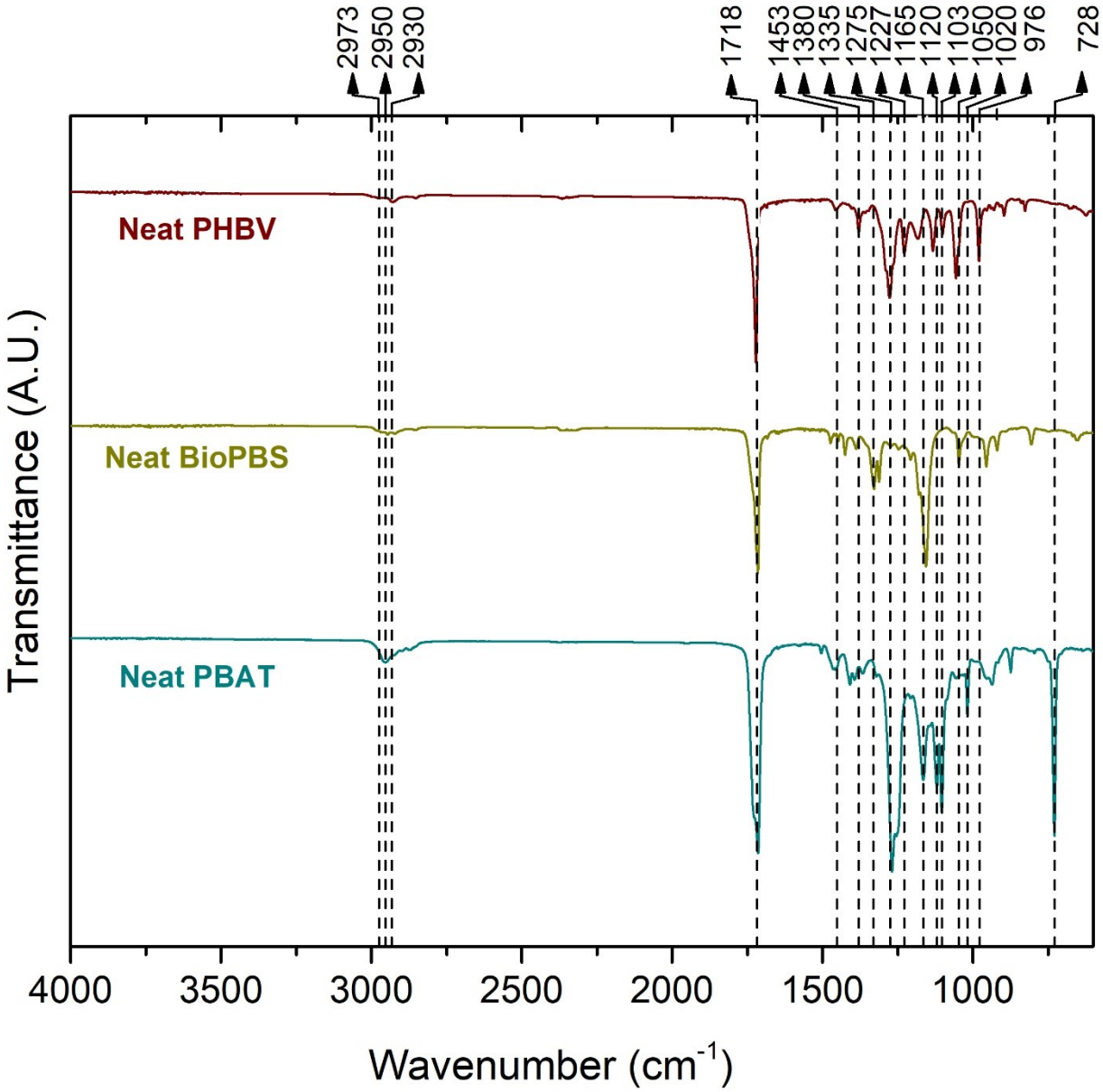

Figure S.6. Transmittance (AU) against wavenumber (cm^{-1}) of neat polymer: PBAT, BioPBS, and PHBV.

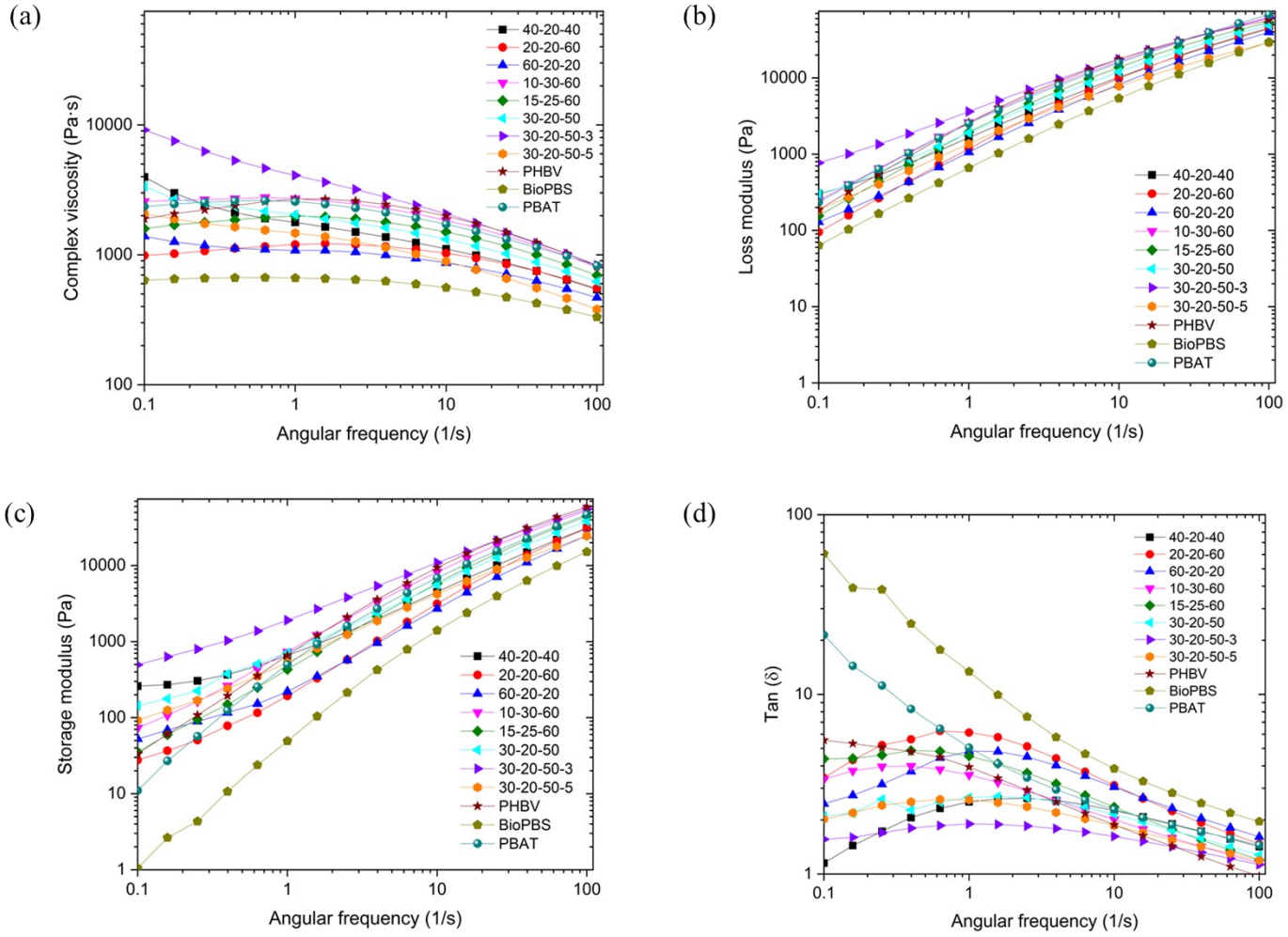

Figure S.7. Rheological properties of neat BioPBS, PBAT, PHBV, and their various blends; (a) storage modulus, (b) loss modulus, (c) complex viscosity, and (d) Tan (δ) of neat biopolymers, their non-compatibilized and compatibilized blends. The samples were identified as BioPBS-PBAT-PHBV-compatibilizer.

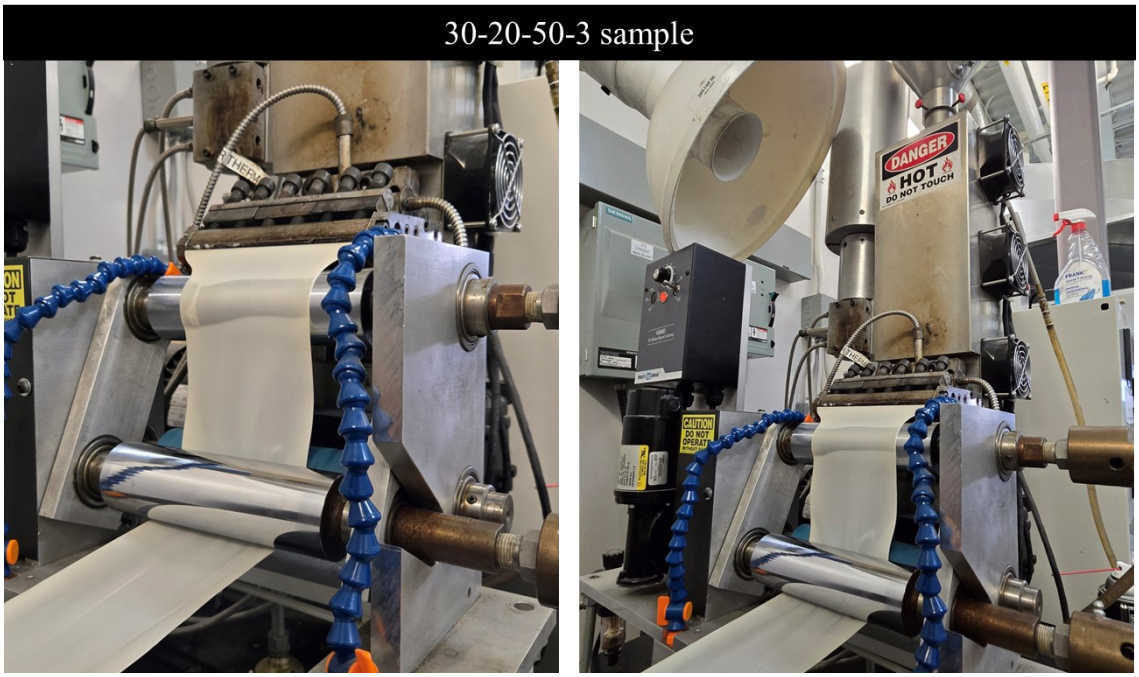

Figure S.8. 30-20-50-3 sample prepared by cast film extrusion.