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Chaloupli et al.

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(54) **BIOBASED ADDITIVE FOR** THERMOPLASTIC POLYESTERS

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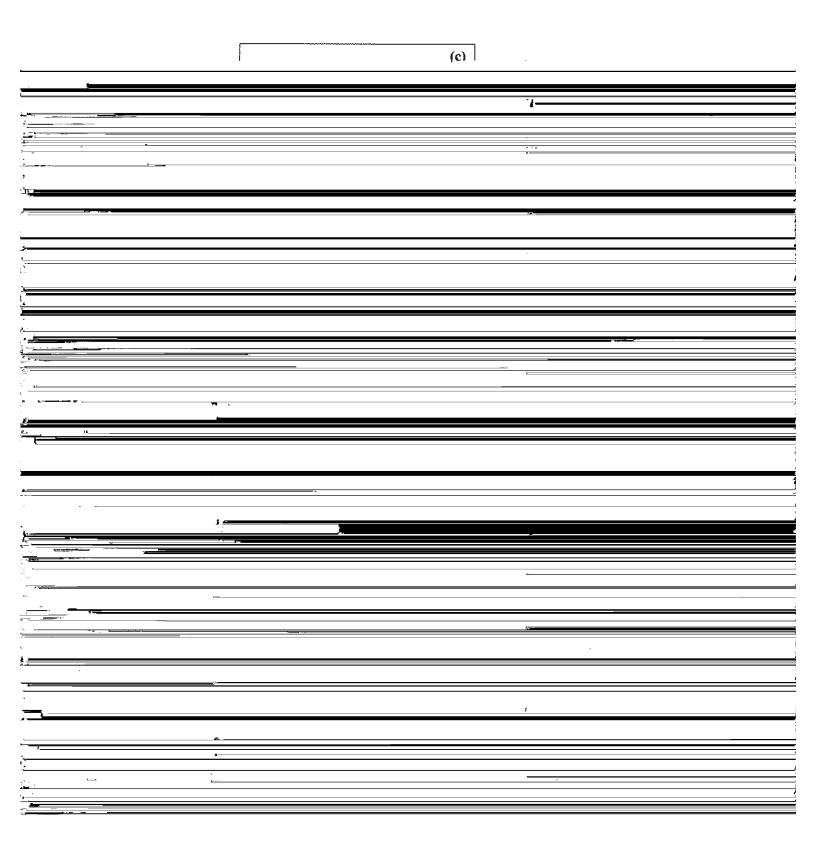
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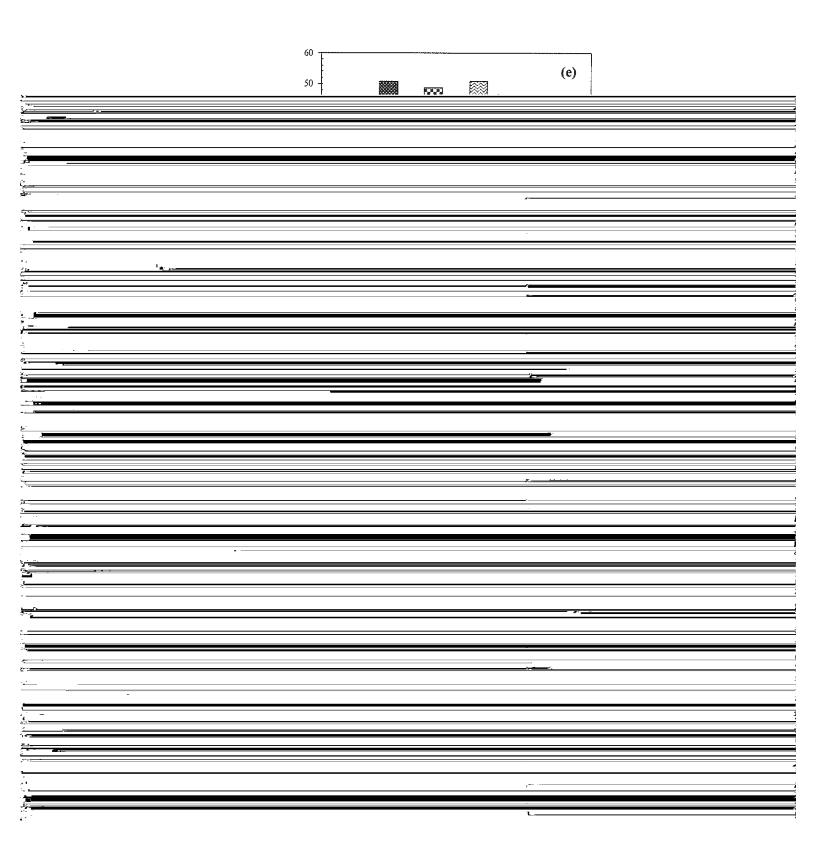
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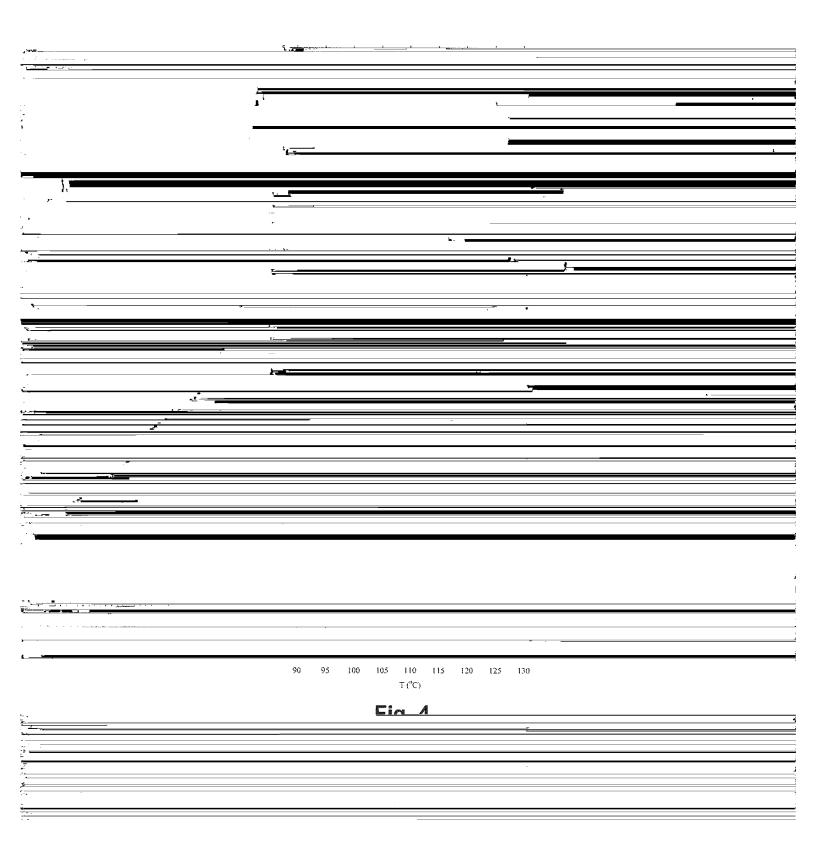
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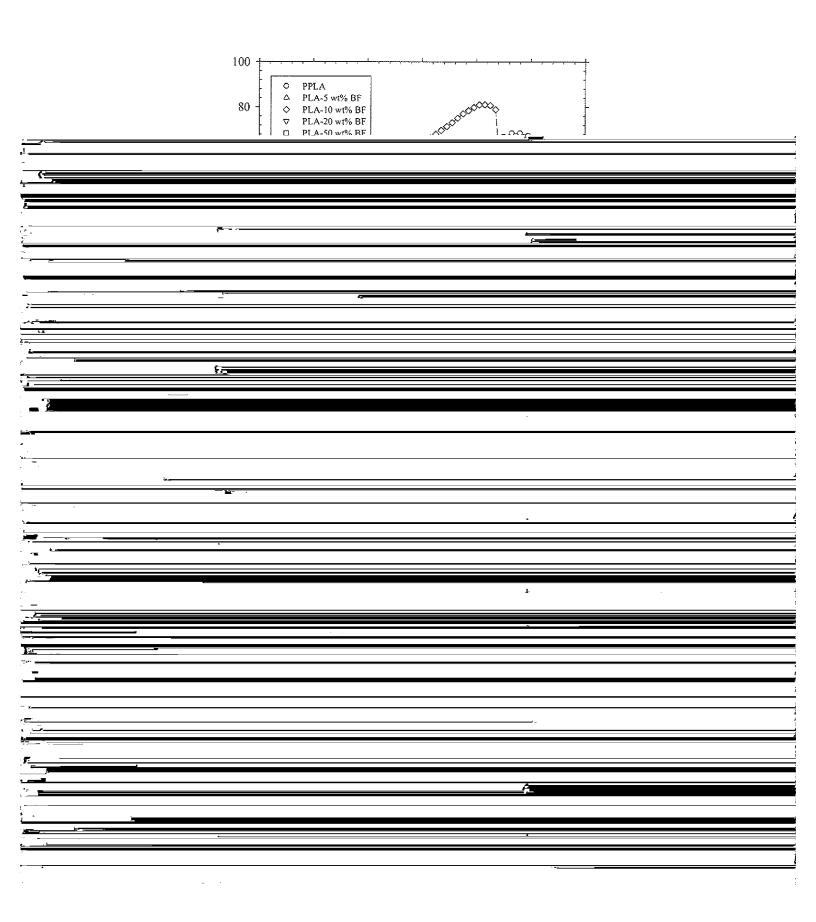
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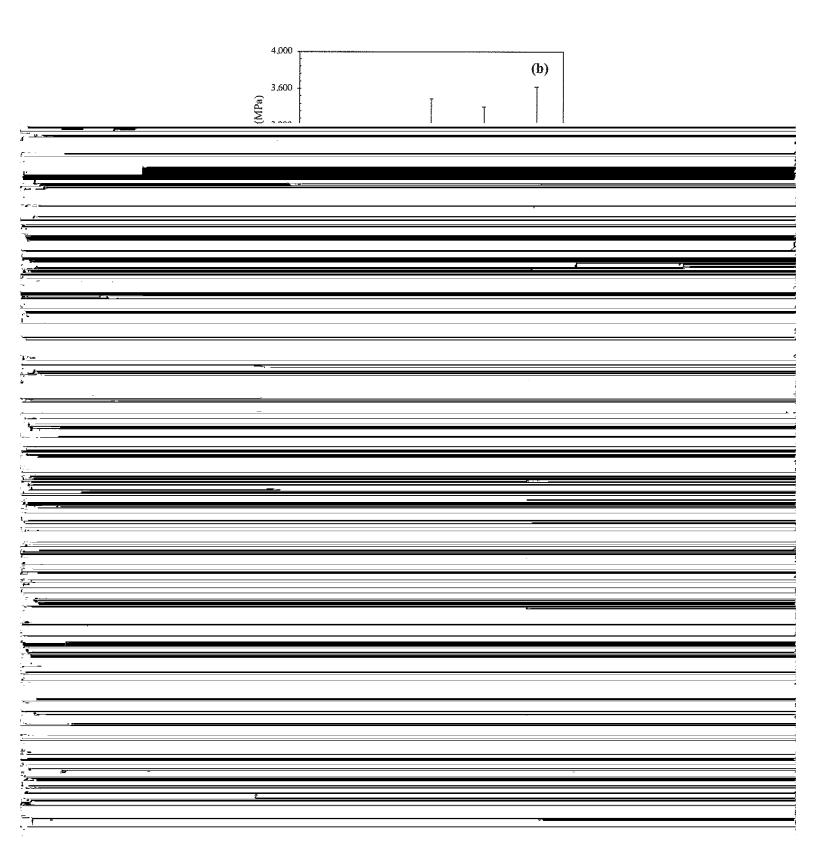
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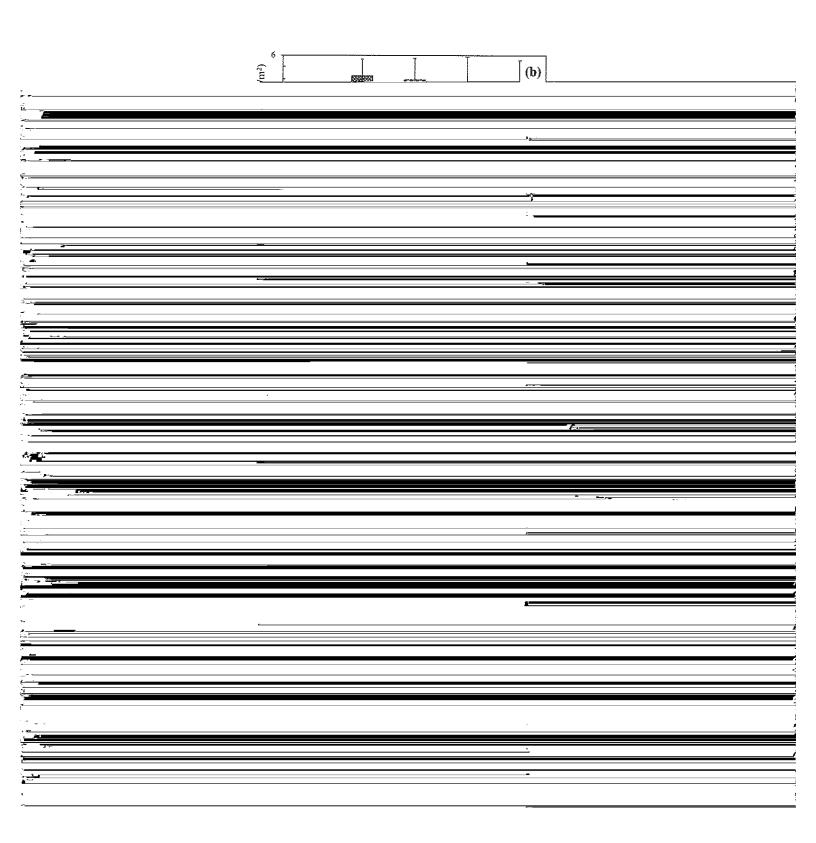


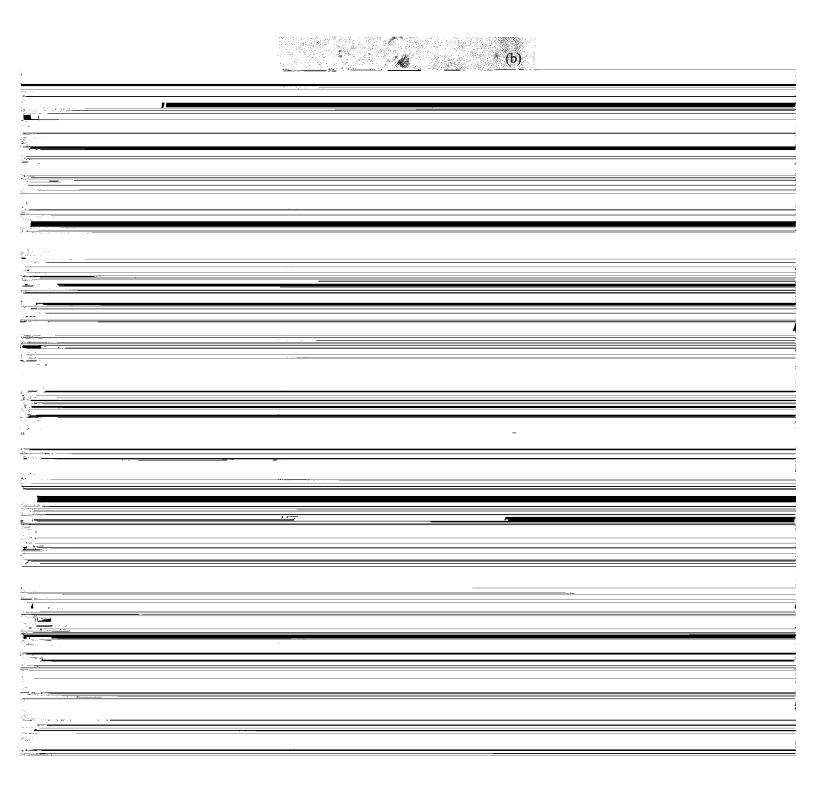








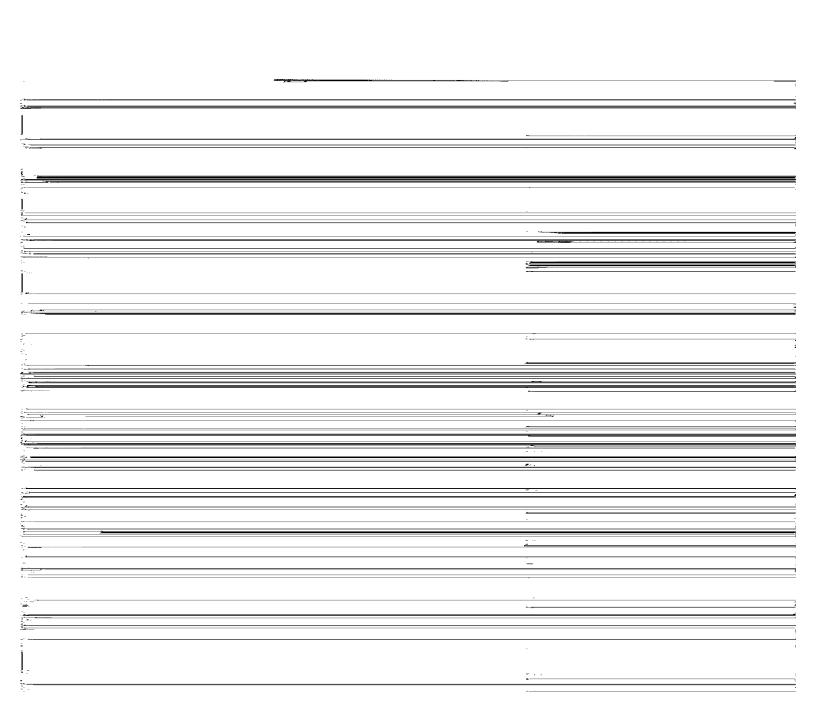




U.S. Patent Dec. 27, 2022

Sheet 9 of 9

US 11,535,745 B2



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BIOBASED ADDITIVE FOR
THERMOPLASTIC POLYESTERS

The invention relates to additives for polyesters used to polye thermoplastic polyester is a non-bioderived polyester. In one embodiment, the thermoplastic polyester is a non-bioderived polyester. In one embodiment, the thermoplastic polyester is a non-bioderived polyester. In one embodiment, the thermoplastic polyester is nolyester is nolyester is nolyester is nolyester.

	make thermoformed injection molded or extruded prod-
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In one embodiment, the mixing is performed in an internal batch mixer. In one embodiment, the grinding is performed in the grinding is performed biopolysester to a temperature sufficient to (i) melt the kionalwaters and (ii) documence a calcated from radical		99:1, 95:5, 90:10, 80:20, 70:30, 60:40, or 50:50 by weight	In one aspect a method is provided of making the	
In one embodiment, the mixing is performed in an internal biobased additive of the above aspect, comprising heating				•
In one embodiment, the mixing is performed in an internal biobased additive of the above aspect, comprising heating				
In one embodiment, the mixing is performed in an internal biobased additive of the above aspect, comprising heating				
In one embodiment, the mixing is performed in an internal biobased additive of the above aspect, comprising heating				
In one embodiment, the mixing is performed in an internal biobased additive of the above aspect, comprising heating				7
In one embodiment, the mixing is performed in an internal batch mixer. In one embodiment, the grinding is performed in an internal batch mixer in one embodiment, the grinding is performed biopolyester to a temperature sufficient to (i) melt the kinnelstester and (ii) decompose a polasted free radical	<u> </u>			,
batch mixer. In one embodiment, the grinding is performed biopolyester to a temperature sufficient to (i) melt the biopolyester to a temperature sufficient to (ii) melt the biopolyester to a temperature sufficient to (iiii) melt the biopolyester to a temperature sufficient to (iiii) melt the biopolyester to a temperature sufficient to (iiii) melt the biopolyester to a temperature sufficient to (iiii) melt the biopolyester to a temperature sufficient to (iiii) melt the biopolyester to a temperature sufficient to (iiiii) melt the biopolyester to a temperature sufficient to (iiiiii) melt the biopolyester to a temperature sufficient to (iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii	,	In one embodiment, the mixing is performed in an internal	biobased additive of the above aspect, comprising heating	1
		batch mixer. In one embodiment, the grinding is performed	biopolyester to a temperature sufficient to (i) melt the	
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la de la composición de la composición Establicada				
embodiment, the method further includes isothermal condi- 5 initiator, adding 0.5 to 2.5 wt % of the free radical initiator		ambodiment the method further includes isothermal condi-	initiator, adding 0.5 to 2.5 wt % of the free radical initiator	
tioning between about 80 to about 120° C. and 0.5 to 2.5 wt % of a crosslinking agent to the biopoly-			and 0.5 to 2.5 wt % of a crosslinking agent to the biopoly-	
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	and the free-radical initiator is DCP. In one embodiment, the amount of TAM is about 1 wt % and the amount of DCP is	PLA and BF-reinforced PLA composites with specified BF loadings.	
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polyester and BF. In some instances, the polyester base is specified in the term, for example "BF-reinforced PLA composite".

As used herein, the term "thermoplastic", or "thermosoft-

poly(butylene adipate-co-terephthalate) (PBAT) and biode-gradable polyesters (e.g., PCL, PBAT, PES, PBS)), the improved properties are particularly advantageous for bioderived polyesters. Examples of thermoplastic bioderived

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	Referring to FIG. 2D, a non-isothermal melt crystalliza-	Referring to FIG. 9A, a graph is shown of the particle size
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	using the laboratory internal mixer (Haake) for 5 min under	14 respectively. The samples were molded at 190° C. and were	
	using the laboratory internal mixer (Haake) for 5 min under	1	
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	The melt mixing of PHR with 5 wt % of RF was carried	4111	
			
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> -	and increased the crystallization rate. The crystallization rate Gel permeation chromatography (GPC) was performed
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	is, first, controlled by nucleation and then crystal growth and using a Viscotek 270 max separation module equipped with
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	K-MAT Secretarion
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	to an enhancement of the density of nuclei, increasing the crystallization rate at the early stage of crystallization. (IV), and light scattering (low angle, LALS and right angle, RALS). The separation module was maintained at 40° C.
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