

Article

The Relationship between a Rotational Molding Processing Procedure and the Structure and Properties of Biobased Polyethylene composites Filled with Expanded Vermiculite

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1. Supplementary data

Table S1. Thermal properties from DSC of samples obtained in rotational molding technology.

		T _M	T _C	ΔH _M	X _C ⁽¹⁾
		[°C]		[J/g]	[%]
Dry blended	HDPE	132,2	117,2	195,6	66,76
	0,5EV	133,2	116,2	188	64,49
	1EV	133,4	116	178,1	61,40
	2EV	134,6	116,4	184,9	64,39
	5EV	133,7	114,7	178,5	64,13
	10EV	134,1	114	180,4	68,41
Compounded	HDPE	133,3	117,2	189,9	64,81
	0,5EV	132,9	117,9	196	67,23
	1EV	133,6	117,7	184,7	63,67
	2EV	133,7	118	191	66,52
	5EV	133	118,3	185	66,46
	10EV	132,8	118,6	177,3	67,24

$$X_C = \frac{\Delta H_M}{(1-\varphi) \cdot \Delta H_{100\%}} \cdot 100\% \quad (1)$$

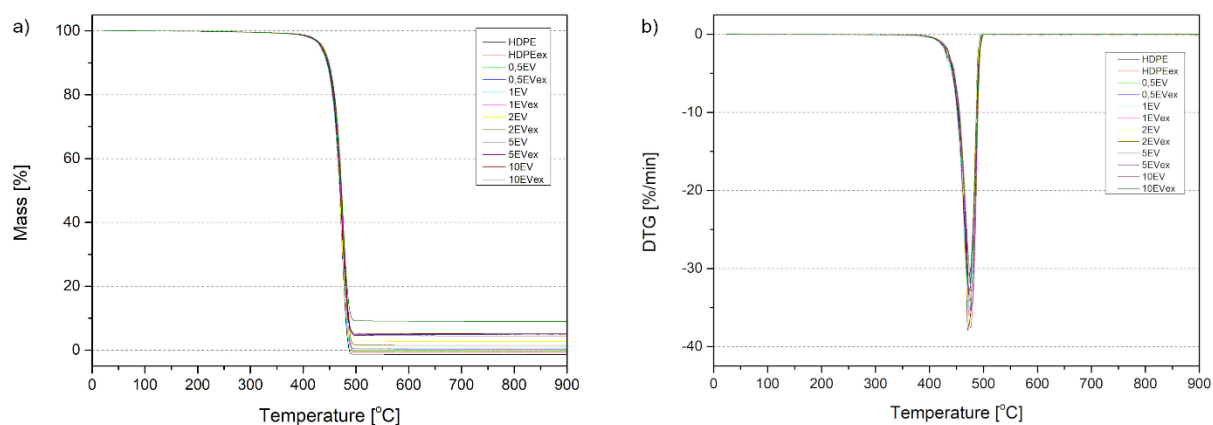
ΔH_M – melting enthalpy [J/g]

ΔH_{100%} – melting enthalpy of 100% crystalline PE (293 J/g)

φ – content of the filler [-]

Table S2. Thermogravimetric properties.

		W ₅	W ₁₀	W ₅₀	DTG		ΔW
			[°C]		[°C]	%/min	[%]
Dry blended	HDPE	433	444,7	468,9	470,9	38,1	-1,37
	0,5EV	433,7	445,8	469,3	474,5	35,03	-0,04
	1EV	433,1	445	469,1	473,6	35,2	0,41
	2EV	434,5	446,5	469,3	472,9	37,08	2,71
	5EV	435,3	446,7	470,2	474,4	32,75	4,83
	10EV	433,4	445,5	469,8	472,6	30,85	5,12
Compounded	HDPE	437,5	449	471,9	476,1	37,63	-0,6
	0,5EV	436,3	447,8	471,4	476,8	35,52	0,44
	1EV	435	447,2	471,3	476,6	35,02	0,36
	2EV	436,4	448,8	473	478,2	34,94	1,5
	5EV	435,3	448,1	472,1	472,4	33,4	4,47
	10EV	435,2	447,3	472,4	475	32,18	8,99

**Figure S1.** TG (a) and DTG (b) curves obtained from thermogravimetric measurement.

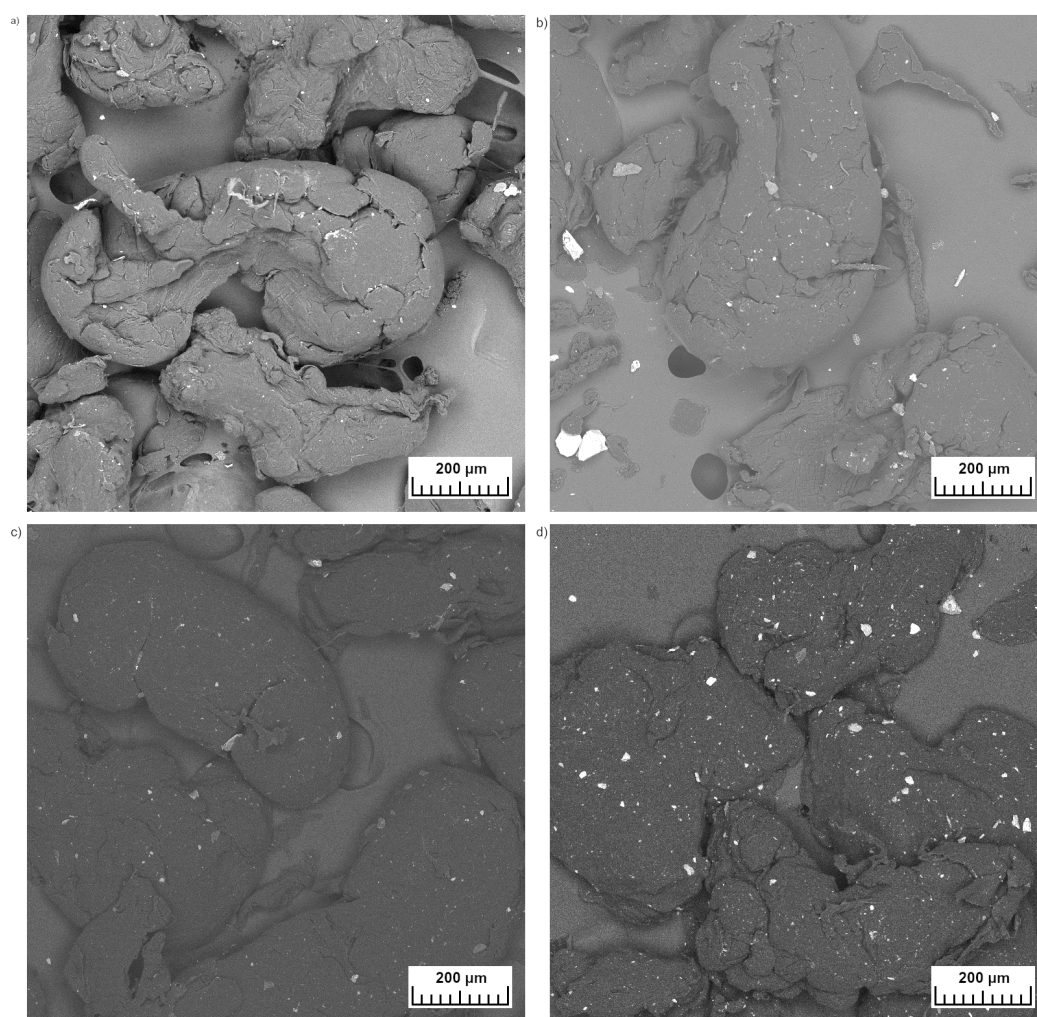


Figure S2. EDS SEM images of composite powder particles containing 0.5 wt% (a), 1 wt%, 2 wt% and 5 wt% of EV.

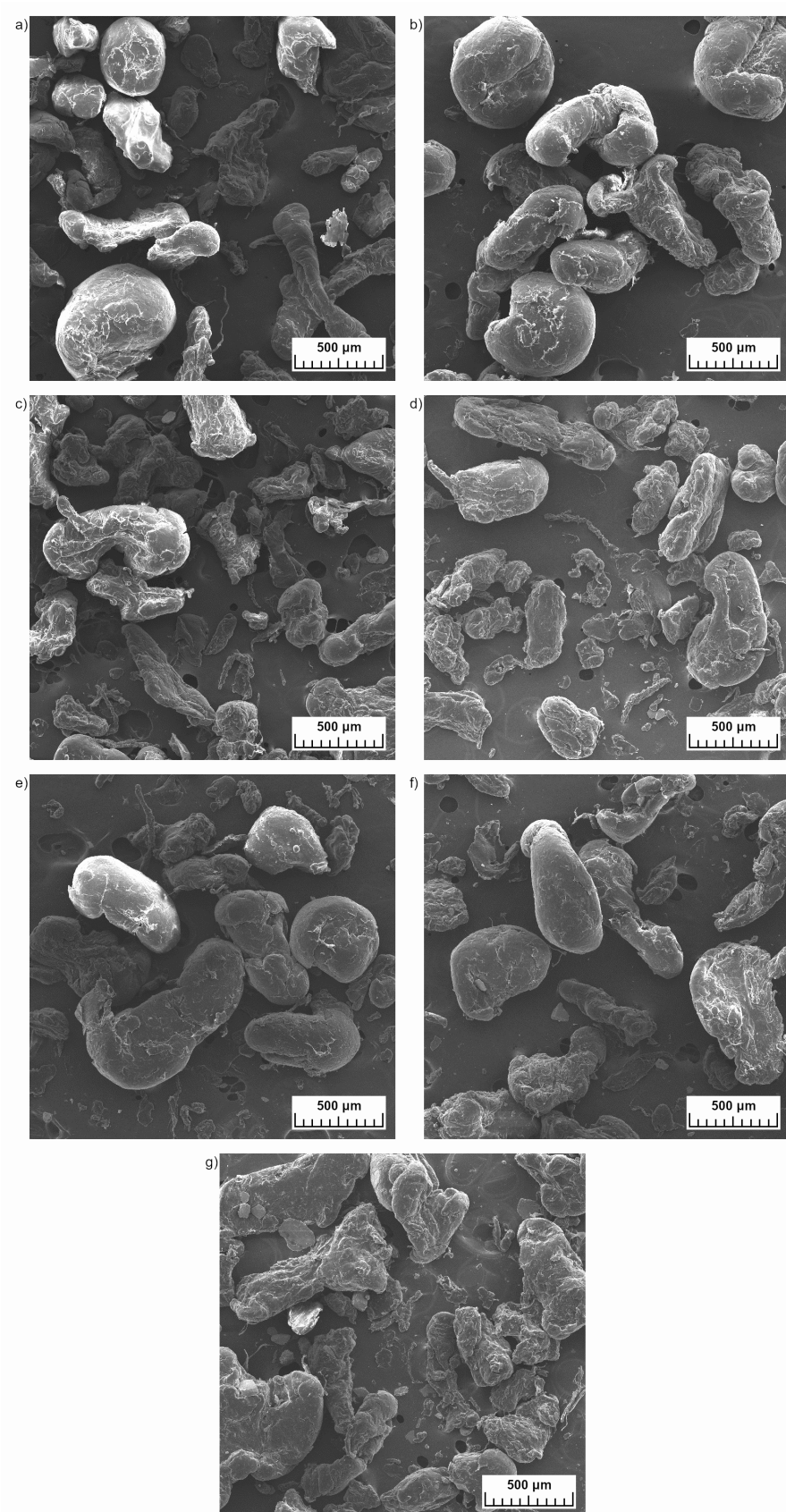


Figure S3. SEM images of HDPE (a) and HDPE_{ex} (b) and composite particles containing 0.5 wt% (c), 1 wt% (d), 2 wt% (e), 5 wt% (f), 10 wt% (g).