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The influence of thermal expanding graphite and aluminosilicate microspheres on flammability of polymer materials

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Table 2. The results of measuring the temperature of samples exposed to an open flame from a gas burner.

Table 1. Fire retardant coating compositions.

Sample No	Composition	Composition Coating thickness, mm
1	1 layer of fire retardant paint produced by "Khimtrast" brand "FireShield (metal)" RAL 9003	0,8
2	2 layers of fire-retardant paint produced by "Khimtrast" brand "FireShield (metal)" RAL 9003	1,0
3	2 layers. 1 layer of fire-retardant paint produced by "Khimtrast" brand "FireShield (metal)" RAL 9003 with thermally expanding graphite in a ratio of 25 mass part per 100 mass part paint, 2 layer fire retardant paint produced by "Khimtrast" brand "FireShield (metal)" RAL 9003	1,15
4	1 layer of fire-retardant paint produced by "Khimtrast" brand "FireShield (metal)" RAL 9003 with aluminosilicate microspheres of the K500 brand in a ratio of 16.67 mass part per 100 mass parts paints "Khimtrast" brand "FireShield (metal)" RAL 9003	1,15
5	2 layers. 1 layer of fire-retardant paint "FireShield (metal)" on epoxy basis 3303 with thermally expanding graphite, with the additional introduction of thermally expanding graphite in a ratio of 15 mass parts per 100 mass parts paints, 2 layer fire retardant paint "FireShield (metal)" on epoxy basis 3303 with thermally expanding graphite	1,2
6	2 layers of fire-retardant paint "FireShield (metal)" on epoxy basis 3303 with thermally expanding graphite	1,2

Time of temperature measurement, min	Temperature, °C						
	Metal plate	sample 1	sample 2	sample 3	sample 4	sample 5	sample 6
0,17	150	70	70	60	50	50	42
0,33	212	75	75	67	60	58	48
0,5	260	80	85	73	67	62	55
1	350	105	90	80	75	66	60
2	535	112	92	82	78	116	71
3	550	116	94	84	76	180	80
4	540	122	97	91	71	-	90
5	580	128	104	94	74	-	96
6	-	133	108	94	74	-	135
7	-	140	109	89	78	-	213
8	-	150	117	85	80	-	-
9	-	168	122	85	82	-	-
10	-	210	125	85	82	-	-



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Fig. 1. Conducting exposed to open flame temperature measurement samples.

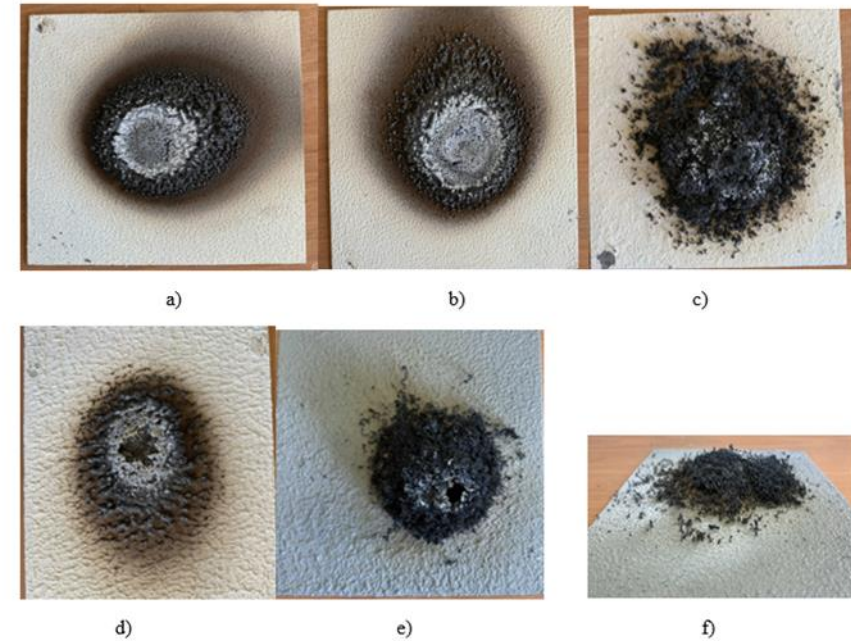


Fig. 2. The appearance of samples exposed to an open flame from a gas burner: a) sample 1; b) sample 2; c) sample 3; d) sample 4; e) sample 5; f) sample.



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The possibility of using thermally expanding oxidized graphite METOPAC EG 350-50 (80) and aluminosilicate microspheres of the K500 brand as additional fire retardants for serial brands of fire retardant paints, as substances which reducing the flammability and improving its consumer properties shows in this work. The results of investigating the samples suggested that aluminosilicate microspheres and thermally expandable graphite could synergistically accelerate the initial stage of decomposition. The formed carbon-ized foam layer could slow down the thermal decomposition of volatile combustibles formed during the decomposition of the fire retardant paint.

This work shows the possibility of using thermally expanding oxidized graphite METOPAC EG 350-50 (80) and aluminosilicate microspheres of the K500 brand as additional fire retardants for serial brands of fire retardant paints, as substances that reduce flammability and improve its consumer properties.

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