STUDYING PHYSICAL AND MECHANICAL PROPERTIES WHEN PROCESSING BINARY POLYMERS

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Abstract
Among man-made waste, polyvinyl chloride (PVC) accounts for 60% of the total amount of polymer waste. Recycling PVC waste is a bit complicated, so the products made from it have a complex chemical composition, that is, various additives will be added.

Keywords: Processing frequency, plasticizer, stabilizer, visco-flow.

Introduction

Properties (MI), soap stock, dioctyl phthalate (DOP), Tensile strength ($\sigma_{рм}$) of the polymer sample was calculated using the following formula [3]:

$$\sigma_{рм} = \frac{F_{рм}}{A_0}$$

Tensile strength ($\sigma_{рр}$) was calculated using the following formula:

$$\sigma_{рр} = \frac{F_{рр}}{A_0}$$

The yield strength at elongation ($\sigma_{рт}$) was calculated using the following formula:

$$\sigma_{рт} = -\frac{F_{рт}}{A_0}$$

Here, $F_{рм}$ - maximum tensile strength, H;

$F_{рр}$ - sample breaking force, H;

FpT - force at the initial rupture of the sample, H;

Ao - initial section of the sample, mm^2.

Elongation at break (εpp) was calculated using the following formula [4]:

$$\varepsilon_{рр} = \frac{\Delta l_{ор}}{l_0} \cdot 100$$

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Here Δl_{op} is the change in sample length during the break, mm;
lop is the initial length of the sample, mm [5].

l_{op} - initial sample length, mm [5].

The results of experiments with secondary polymer waste are shown in Table 2 below [6]:

Table -2 Physico-mechanical properties of samples

Polymer names	F_{pt}	F_{pm}	F_{pp}	Δ/op
Granules P-Y456	31,07	31,08	12,45	65,4
Secondary PE	17,9	17,9	8,7	62,43
ПЭ + plasticizer; 1 : 0,1	13,4	13,4	6,5	44,3
ПЭ + plasticizer; 1 : 0,3	11,3	11,4	4,8	30,2
ПЭ + plasticizer; 1 : 0,5	10,2	10,1	3,6	28,5
Polipropilen	42,3	42,01	33,2	75,6
Secondary PP	28,8	28,7	27,3	56,4
PP + plasticizer; 1 : 0,1	25,00	25,01	24,8	45,3
PP + plasticizer; 1 : 0,3	22,58	21,67	20,8	25,56
PP + plasticizer; 1 : 0,5	19,4	17,3	16,3	21,22
PVX	38,5	37,8	26,1	50,7
Secondary PVX	21,37	20,72	20,8	41,44
PVX + plasticizer; 1 : 0,1	15,68	15,70	15,60	15,8
PVX + plasticizer; 1 : 0,3	13,91	13,91	13,90	12,92
PVX + plasticizer; 1 : 0,5	11,7	10,1	10,05	9,64
Secondary PE, PP, PVX	24,6	23,8	23,0	36,7
Secondary PE, PP, PVX + plasticizer; 1 : 0,1	18,3	17,9	18,5	27,0
Secondary PE, PP, PVX+ plasticizer; 1 : 0,3	17,0	16,8	17,5	24,7
Secondary PE, PP , PVX+ plastifikator; 1 : 0,5	14,2	13,4	13,1	21,2

As can be seen from Table 2 above, virgin polyethylene P-Y456 has Tensile strength ($\sigma_{рм}$), tensile strength ($\sigma_{рр}$), elongational yield strength ($\sigma_{рт}$) and elongation (εpp) at different ratios of recycled waste PE, PP and PVC and their plasticizers can be seen that all these indicators decreased slightly compared to mixtures [7]. It can be seen that this situation can be further reduced by introducing mixtures of plasticizers (soapstock and DOP) into the recycled polymer waste. From this we can conclude that the physical and mechanical properties of mixed polymer waste deteriorate during recycling [8]. However, the inclusion of a plasticizer in their composition helps to transform polymer mixtures into homogeneous homogeneous masses and improve orientation properties in the structures of polymer mixtures, and also serves to improve the molding properties of polymer raw materials [9].

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