JOURNAL OF MATERIALS SCIENCE 22 (1987) 429–437

Polyamide 6/ethylene-co-vinylacetate blends: morphology–properties relationships in injection moulded samples

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The properties of injection moulded bars of blends of polyamide 6 with several samples of ethylene–vinyl acetate copolymer (EVA) differing in vinylacetate content, molecular mass and melt viscosity and with one sample of an ethylene–vinylacetate–acrylic acid terpolymer were investigated. Correlations between molecular structure of EVA copolymers, overall composition, mode and state of dispersion of minor component and impact behaviour of injection moulded sheets of PA6/EVA blends were established.

1. Introduction

In a previous paper we reported the results of an investigation concerning the study of melt rheology, morphology and impact behaviour of blends obtained by melt mixing a sample of Nylon 6 (PA6) with a sample of an ethylene–vinylacetate copolymer (EVA) (28.8% (wt/wt) of vinylacetate) [1]. Different blend morphologies, strongly depending on the post blending processing conditions (extrusion by means of a capillary rheometer at very low shear rate and injection moulding) and on the blend composition, were observed.

In the case of injection moulded samples it was found that parameters such as moulding temperature, residence time as well as EVA content play an important role in determining the final mode and state of dispersion of minor component and then the impact behaviour of the blends [1].

In the absence of chemical reaction between the constituent components in such a heterogeneous system the success in improving physical–mechanical properties depends mainly on the control of mode and state of dispersion of the dispersed phase and on the ability to increase interfacial interactions [2–4].

The average particle size of the primarily formed particles and particle size distribution of the minor component depend on the phase viscosity ratio and on the molecular characteristics of the impact modifier used (molecular composition, presence of crystallizable segments, molecular mass distribution etc.).

In the present paper we report on the results of a study on the properties of blends of PA6 with several samples of EVA differing in vinylacetate content, molecular mass and melt viscosity. Blends of PA6 with a sample of ethylene–vinylacetate–acrylic acid terpolymer where also investigated in order to assess the influence of carboxylic pendant groups on the interfacial adhesion between the dispersed phase and the PA6 matrix.

The work was undertaken with the aim to establish correlations between molecular characteristics of EVA copolymers, blend composition, overall morphology and impact behaviour of injection moulded sheets of PA6/EVA blends.

2. Experimental details

2.1. Materials

Three different commercial ethylene–vinylacetate copolymers (EVA) and an ethylene–vinylacetate–acrylic acid terpolymer, all produced by Du Pont, were used as impact modifiers of Nylon 6 (PA6).

The trade names of the copolymers and terpolymer, the content (wt/wt) of vinylacetate and acrylic acid, the melt flow index (ASTM D 1238), the melting temperature and the glass transition temperature are listed in Table I. Sample of Nylon 6 (PA6), trade name SNIAMID ASN 27 S produced by SNIA with a number average molecular weight ($\bar{M}_n$) of 2.3×10^4, was used throughout the work.

2.2. Blending

All blends investigated were obtained by melt mixing the components. A single screw extruder (Gottfert; $L/D = 25\,\mathrm{mm}$; $\Phi = 30\,\mathrm{mm}$) operating at 50 r.p.m. and at a temperature of 260° C was used. Before blending the polyamide was dried in a stove at 90° C for 24 h. The compositions examined for all copolymers are listed in Table II.

2.3. Sample preparation

The extrudate materials were injection moulded by means of an injection press (Negri & Bossi V79 FA; $\Phi = 30\,\mathrm{mm}$) at a temperature of 220° C with a processing cycle of 40 sec. The temperature of the

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TABLE I Molecular characteristics, glass transition (T_g) and observed melting temperatures (T'_m) of the starting polymers

Trade name	% vinylacetate (wt/wt)	Melt index (g 10 min^{-1})	T_g (°C)	T'_m (°C)	% acrylic acid (wt/wt)
SNIAMID ASN27S	–	–	48	219	–
Elvax 250	28.8	28.0	−27	59	–
Elvax 220	28.8	168	−21	56	–
Elvax 40	42.0	66	−17	53	–
Elvax 4320	26	175	−22	64	0.5 to 1.0

moulds was 40° C. The obtained parallelepipedal specimens had the following dimensions: 13 mm wide, 62 mm length, 7 mm thick. Before performing Izod impact tests, a 0.50 mm deep notch with a tip radius of 0.25 mm was made on each sample. All the samples previously obtained were stored in a double polyethylene sealed envelope in order to avoid water absorption.

2.4. Techniques

The glass transition temperatures, the melting temperatures and the crystallinity index of both plain polymers and blends were obtained by using a differential scanning calorimeter (Mettler TA 3000). The DSC measurements were performed both on the whole cross slices and on the central part of the slices cut from the parallelepipedal specimens.

The following procedure was used: the samples (about 20 mg) were heated from −100 up to 260° C with a rate of 20° C min^{-1} and the heat (dH/dt), evolved during the scanning process, was recorded as a function of temperature. The T_g of the starting polymers, taken as the temperature corresponding to 50% of the transition, are listed in Table I.

According to literature data [5], the T_g of PA6 is found at about 48° C. The T_g of the EVA copolymers is dependent on the molecular characteristics such as vinylacetate content and molecular mass. As can be expected a higher T_g value is exhibited by Elvax 40.

The observed melting temperature T'_m and the apparent enthalpies of fusion ΔH^* were, respectively, obtained from the flex point and the area of the melting peaks. The thermograms of EVA copolymers show the presence of endothermic peaks due to the melting of ethylene blocks; the corresponding temperature values are reported in Table I. It is interesting to note that Elvax 4320 is characterized by the higher T'_m (64° C).

The crystallinity index of PA6 phase (X_c (PA6)) and of overall blend (X_c (blend)) was calculated by means of the following relations:

$$X_c(\text{PA6}) = \frac{\Delta H^*(\text{PA6})}{\Delta H^\circ(\text{PA6})};\qquad X_c(\text{blend}) = \frac{\Delta H^*(\text{blend})}{\Delta H^\circ(\text{PA6})} \tag{1}$$

TABLE II Blend composition investigated

Component	Composition (percentage (wt/wt))				
PA6	100	95	90	80	0
Copolymer	0	5	10	20	100

where ΔH^* (PA6) is the apparent enthalpy of fusion per gram of PA6 in the blend; ΔH° (PA6) is the heat of fusion per gram of 100% crystalline PA6 (from literature data [6] ΔH° (PA6) = 188 J g^{-1} and ΔH^* (blend) is the apparent enthalpy of fusion per gram of blend.

Izod impact tests were carried out at room temperature on dry samples of the injection moulded blends by using a fracture pendulum (Ceast Autographic Pendulum). The fracture surfaces of the broken specimens were examined by using a scanning electron microscope (SEM 501 Philips) after coating with Au/Pd.

3. Results and discussion

3.1. Mode and state of dispersion of minor component

The analysis by SEM of the mode and state of the EVA dispersion into the polyamide matrix, performed on the Izod fracture surfaces shows:

(i) an anisotropic distribution of the dispersed phase. As shown by Fig. 1 at the outer skin of the samples no impact modifier is observable. The thickness of the layer, that is free of EVA domains, seems to depend on the molecular features and chemical nature of the EVA used. It was found that the thickness increases with increasing the melt viscosity of the EVA copolymer (compare Figs 1 and 2). A comparison between samples containing Elvax with about the same melt index (Elvax 220 and Elvax 4320) shows that surface fracture of blends of PA6 with terpolymer (Elvax 4320) are characterized by a relatively thicker border layer free of dispersed domains. Moreover, it is to be underlined that, moving toward the core of specimen, the concentration of copolymer increases with increasing the distance from the skin, showing gradient character (compare Fig. 1 with Fig. 3).

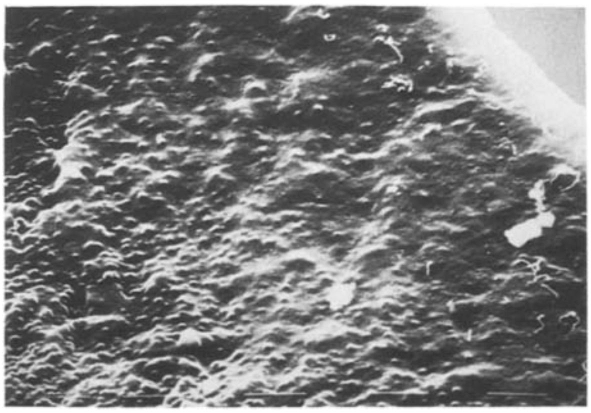

Figure 1 SEM micrograph of Izod fracture surface of 80/20 PA6/Elvax 40 blend (1900 ×) (region close to the borders).

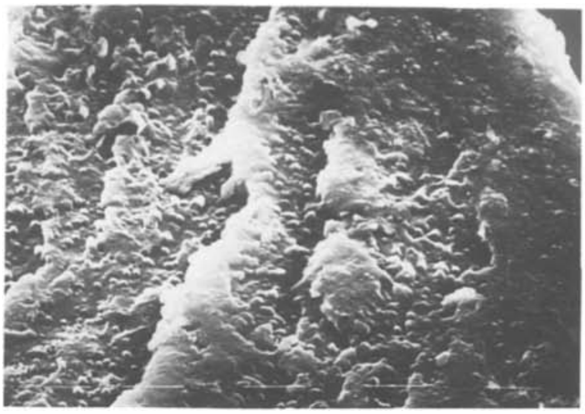

Figure 2 SEM micrograph of Izod fracture surface of 80/20 PA6/ Elvax 220 blend (1900 ×) (region close to the borders).

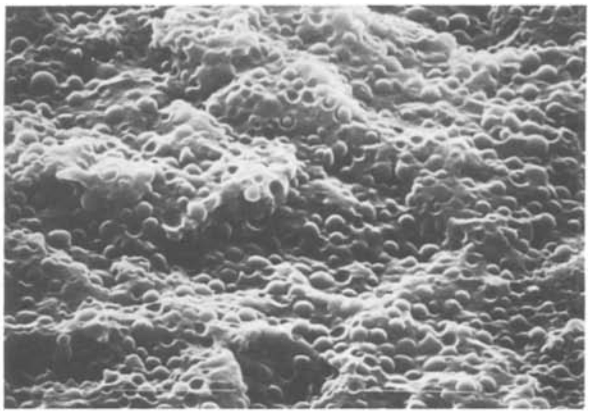

Figure 4 SEM micrograph of Izod fracture surface of 80/20 PA6/ Elvax 250 blend (3800 ×) (region far from the notch, propagation zone).

The enrichment of the modifier in the core can be attributed probably to the fact that the crystallizing front, moving from the mould walls, initially rejects the rubbery domains. The EVA particles will be occluded only when crystallization starts also in the inner part of the samples at higher temperature with a lower rate [7].

The non-homogeneous distribution of EVA particles in the moulded samples, in principle, can also be related to a certain type of flow acting in the melt before the crystallization starts.

(ii) The dispersed phase segregates in spherical shaped domains. The average size of such domains seems to be dependent on the molecular nature of the used Elvax.

In the case of Elvax 250 containing blends the copolymer domains have an average diameter of 1 to 2 μm irrespective of blend composition (see Figs 4 and 5). Furthermore as shown by Fig. 5, it seems to be a very poor adhesion of the interface; the walls of the cavities left and the unscored surfaces of the copolymer domains look smooth.

In the case of PA6/Elvax 220 blends, one observes that, going from the skin toward the core, the EVA particle size increases (compare Fig. 6 with Fig.7). Moreover, the EVA average particle size depends on the blend composition. As a matter of fact the average particle diameter, in the core region, increases with enhancing the copolymer content. The observed average size is 1, 3 and 5 μm for blends containing 5, 10 and 20% EVA, respectively (compare Figs 7 to 9).

It is to be pointed out that such a copolymer shows a dispersion degree and an average particle size different from Elvax 250, even though both contain the same percentage of vinylacetate (in the core of the samples the domains of Elvax 220 have larger dimensions than those of Elvax 250).

From the above it can be concluded that for the same copolymer composition the mode and state of dispersion of the minor component is mainly determined by the melt viscosity of the Elvax.

Poor adhesion between polyamide and Elvax 220 is observed as already seen in Elvax 250 containing blends (see Fig. 7).

In the case of moulded samples of PA6/Elvax 40 blends the copolymer forms very small spherical shaped domains (0.5 to 1 μm in average diameter) (see Figs 10 and 11) with no evidence of adhesion with the matrix.

Such a high degree of dispersion may be accounted for by the relatively higher content of vinylacetate and by the medium melt flow index value of the copolymer (see Table I).

In the case of PA6/Elvax 4320 blends, it was found that the terpolymer forms droplets having an average diameter of 1 to 2 μm irrespective of blend composition (see Fig. 12).

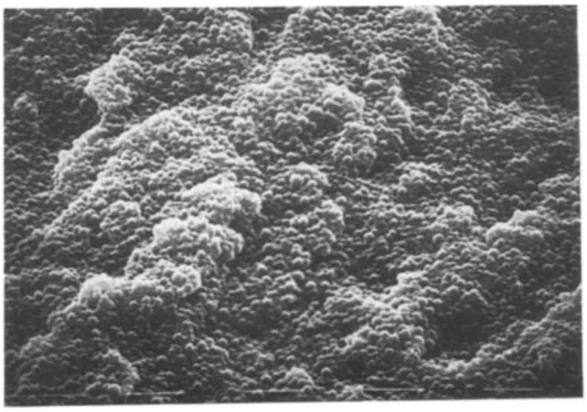

Figure 3 SEM micrograph of Izod fracture surface of 80/20 PA6/ Elvax 40 blend (1900 ×) (region far from the borders).

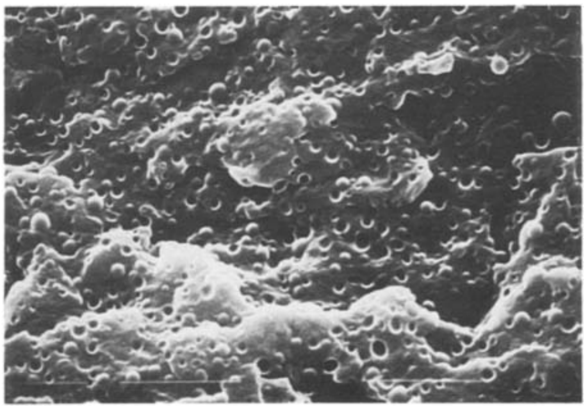

Figure 5 SEM micrograph of Izod fracture surface of 90/10 PA6/ Elvax 250 blend (3800 ×) (region far from the notch, propagation zone).

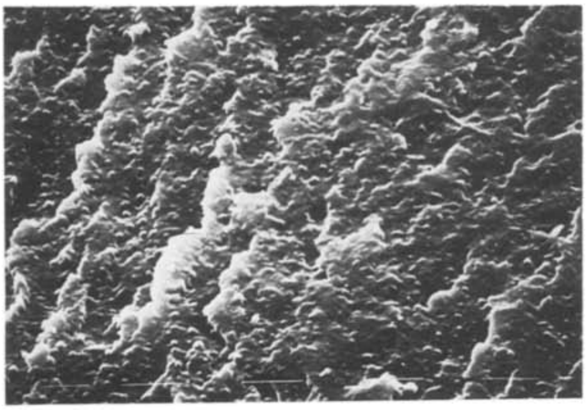

Figure 6 SEM micrograph of Izod fracture surface of 80/20 PA6/Elvax 220 blend (1900 ×) (region close to the surface border).

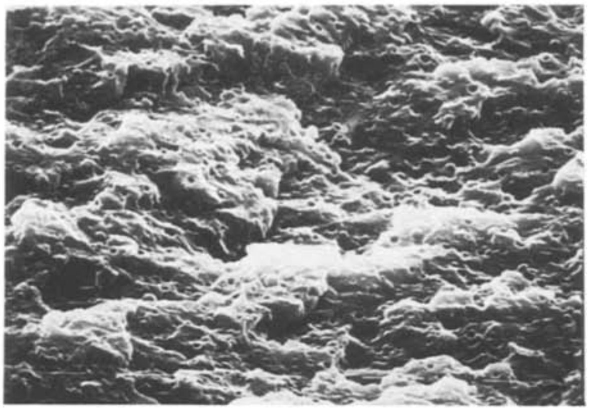

Figure 8 SEM micrograph of Izod fracture surface of 95/5 PA6/Elvax 220 blend (1900 ×) (central region).

It is to be noted that a better degree of dispersion is achieved in respect to Elvax 220 containing blends (compare Fig. 12 with Fig. 7), although Elvax 220 and Elvax 4320 contain about the same percentage of vinylacetate and have about the same melt flow index (see Table I).

Furthermore, contrary to that observed in PA6/EVA blends, Elvax 4320 spherical domains appear embedded into the matrix with evidence of some kind of adhesion (see Fig. 13).

Thus it may be concluded that the presence of acrylic acid along the EVA chains induces both a better dispersion degree and adhesion.

Moreover it was found that Elvax 4320 and Elvax 250, characterized by about the same vinylacetate content show practically the same mode and state of dispersion in blends with PA6 irrespective of their different melt index (see Table I). From this one infers that the phase viscosity ratio is not the only factor that determines the particle size distribution. It is likely that the presence of acrylic acid units along the EVA chain influences the equilibrium surface tension of particles.

3.2. Thermal behaviour and crystallinity

The DSC thermograms of plain PA6 show multiple melting peaks. In principle at least, the occurrence of multiple peaks on the melting endotherms can be attributed to recrystallization phenomena in the course of heating, step-like melting of folded chain and bundle-chain lamellae, polymorphic transitions. To facilitate the interpretation of the various endothermic processes during the melting in DSC we recall that both α and γ crystalline modifications are formed during melt crystallization of PA6.

It is well known that the growth of these crystalline forms depends on the crystallization conditions [8, 9].

In Table III the PA6 melting temperatures corresponding to the highest temperature peaks are reported as a function of composition. It seems reasonable to suppose that such temperatures are characteristic of the melting of the more stable α crystalline form of PA6. From the analysis of the data listed in Table III it seems moreover that the addition of EVA copolymer does not affect systematically the melting temperature of the polyamide. Such result indicates that PA6 and EVA copolymers are incompatible in the melt state.

The DSC crystallinity index of the whole blend (X_c(blend)) and that of PA6 phase (X_c(PA6)) was determined on a section cut transversally from the moulded bars. Two sets of measurements were performed: in one, half of the overall section, including the boarders, was used ($X_c(w)$) in the other DSC thermograms were registered only on that part of the section that includes the inner core of the sample ($X_c(c)$). The crystallinity values of the core bar,

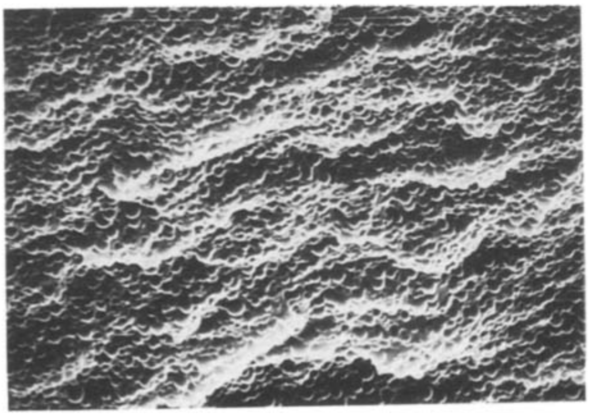

Figure 7 SEM micrograph of Izod fracture surface of 80/20 PA6/Elvax 220 blend (1900 ×) (central region).

TABLE III Observed melting temperatures of plane PA6 and blend investigated as deduced from the highest temperature peak. The error on T'_m values is ±2° C.

Samples	Composition % (wt/wt)	T'_m (° C)
PA6	100	219
PA6/Elvax 220	95/5	218
PA6/Elvax 220	90/10	219
PA6/Elvax 220	80/20	217
PA6/Elvax 250	95/5	224
PA6/Elvax 250	90/10	220
PA6/Elvax 250	80/20	218
PA6/Elvax 40	95/5	220
PA6/Elvax 40	90/10	219
PA6/Elvax 40	80/20	221
PA6/Elvax 4320	95/5	221
PA6/Elvax 4320	90/10	222
PA6/Elvax 4320	80/20	219

TABLE IV Crystallinity index of PA6 phase of both whole bar section ($X_c(w\mathrm{PA6})$) and core bar section $X_c(c\mathrm{PA6})$ and crystallinity index of PA6/EVA blends of both whole bar section ($X_c(w$ blend) and core bar section ($X_c(c$ blend)) as a function of composition

Samples	Composition % (wt/wt)	$X_c(w$ blend)	$X_c(c$ blend)	$X_c(c/w\mathrm{PA6})$	$X_c(c\mathrm{PA6})$
PA6	100			65	67
PA6/Elvax 220	95/5	61	57	64	60
PA6/Elvax 220	90/10	56	54	62	60
PA6/Elvax 220	80/20	53	46	66	58
PA6/Elvax 250	95/5	63	58	66	61
PA6/Elvax 250	90/10	60	55	67	61
PA6/Elvax 250	80/20	51	52	64	65
PA6/Elvax 40	95/5	62	52	65	55
PA6/Elvax 40	90/10	58	52	64	58
PA6/Elvax 40	80/20	55	50	69	62
PA6/Elvax 4320	95/5	57	55	60	58
PA6/Elvax 4320	90/10	54	53	60	59
PA6/Elvax 4320	80/20	47	45	59	56

compared with that of transversal bar section are reported in Table IV as a function of composition. As may be expected the values of X_c (blend) decrease with increasing the copolymer content.

It is interesting to note that the $X_c(w$ blend) values result higher than that of $X_c(c$ blend). This finding is to be related to the mode and state of the copolymer dispersion emphasized by the morphological analysis previously reported. As a matter of fact the concentration of the dispersed phase results are higher in the core of the bar showing gradient character going from the border toward the core of the sample. Consequently the amount of PA6 in the core of samples is lower.

3.3. Fractography

Injection moulded samples of plain PA6, broken at room temperature, show surfaces with the presence of a distinct induction region where PA6 undergoes plastic deformation; no stress whitening is observed. Such an observation suggested that yielding is the predominating process in determining the mode and fracture mechanism [1].

A careful analysis by SEM of the Izod fracture surfaces of samples of PA6/Elvax blends leads to the following conclusions:

(i) the broken surfaces of all blends exhibit a fracture induction zone covering an area localized in the middle of the notch front (see Fig. 14). As shown by Fig. 15 in such areas there are signs of plastically deformed material indicating that a diffuse shear yielding takes place throughout. The remainder of the surface is characterized by the presence of steps, which arise from adjacent sections of the fracture front following paths at different levels.

(ii) the area of the induction region and consequently the material volume undergone to plastic deformation results are larger than that of pure PA6 (compare Fig. 17 with Figs 14 to 16).

It was moreover found that the extension of such induction area is dependent on the kind of copolymer used and increases with increasing its content in the blend.

The larger induction area is observed in Elvax 40 containing blends (compare Fig. 16 with Figs 14, 18 and 19).

(iii) all the fracture induction regions exhibit stress-whitening indicating multiple crazes formation during the fracture. It is noticeable that, for a given composition, the extent of such a phenomenon depends on the type of copolymer used. Blends containing Elvax 40 seem to be characterized by a stress whitened material volume that is larger than for PA6/Elvax 220 and 250 blends. It is to be noted that the PA6/terpolymer blends are less involved in stress-whitening phenomenon.

Figure 9 SEM micrograph of Izod fracture surface of 90/10 PA6/Elvax 220 blend (1900 ×) (central region).

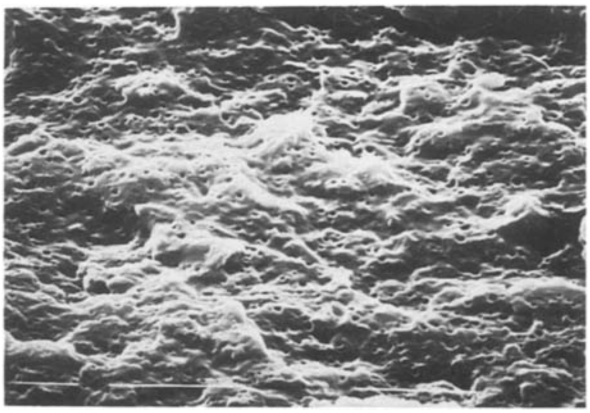

Figure 10 SEM micrograph of Izod fracture surface of 90/10 PA6/Elvax 40 blend (3800 ×) (region far from the notch, propagation zone).

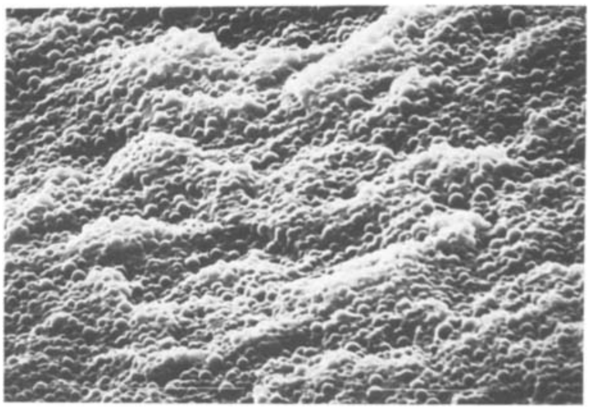

Figure 11 SEM micrograph of Izod fracture surface of 80/20 PA6/Elvax 40 blend (3800 ×) (region far from the notch, propagation zone).

The above morphological evidence suggests that the fracture mode of the PA6/EVA blends comes from a combined effect of multicraze propagation and shear yeilding. Considering the PA6/terpolymer blends the multicraze fracture mechanism appears less active in avoiding catastrophic fracture.

3.4. Izod impact behaviour

The Izod impact strength values (R) for the plain polyamide and for all the blends investigated are reported in Fig. 20 as a function of composition. As shown, by adding Elvax 220 to PA6 no improvement in the impact strength of PA6 is obtained.

The Elvax 220 inability to confer toughening in polyamide could depend on the particle size and on the poor adhesion at the interface as suggested by the morphological analysis previously reported.

It is likely that in such blends the average dimensions of the Elvax 220 spherical domains results are larger than the optimum size required for optimum toughness [10–12].

Furthermore, a weak adhesion would tend to permit easy cavitation at the interface rather than multicraze and/or shear yielding in the polyamide so lowering the fracture energy.

An improvement in the PA6 impact strength by adding Elvax 250 is produced (see Fig. 20); the extent of such improvement is larger with increasing the copolymer content in the blend.

As shown by the fractographic analysis and in agreement with the results reported in the previous paper [1] at room temperature a diffuse shear yielding accompanied by multicraze formation during the fracture are responsible for the polyamide strengthening.

The different behaviour as impact modifier of Elvax 220 and Elvax 250 copolymers may be due to the fact that in blends with PA6 they give rise to domains with different degrees of dispersity (average particles size); this in turn could affect the development and interaction between shear yielding and/or multicraze formation and propagation.

The parameter responsible for the degree of dispersity of dispersed domains seems to be the different molecular mass of Elvax 220 and Elvax 250 copolymers as they contain the same percentage of vinylacetate (see Table I).

Considering the Elvax 4320 containing blends, it comes out that, as it may be expected, the 5% of copolymer does not reinforce the PA6. By adding 10 or 20% of Elvax 4320 the impact strength of polyamide rises up to 8.2 kg cm/cm^2 (see Fig. 20). It is to be noted that, for the same content of the added copolymer, the extent of the observed increase in R values is lower than that obtained by using Elvax 250, even though a better adhesion was observed between the matrix and the dispersed domains in the case of PA6/Elvax 4320 blends.

As shown by Fig. 20 by adding Elvax 40 to PA6 a remarkable increase in R values is obtained. The improvement is larger enhancing the copolymer content in the blend. Such a result is in agreement with the fractographic analysis previously reported showing that Elvax 40 containing blend undergoes a higher plastic deformation and stress whitening during the fracture. Such ductile behaviour may be accounted for by considering that as shown by the morphological analysis, the Elvax 40 particles have reduced average dimensions in respect to those of the other copolymers employed. Such observation is likely related to the higher content of vinylacetate in Elvax 40 copolymer. Such a large amount of vinylacetate and consequently of acetic groups helps the chemical affinity between

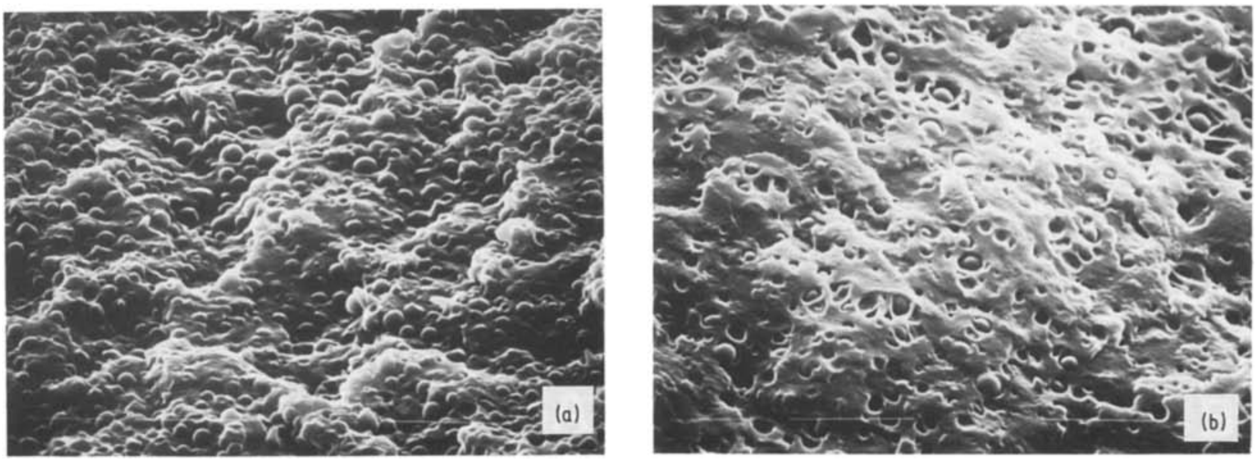

Figure 12 SEM micrographs of Izod fracture surface of PA6/Elvax 4320 blend (a) 80/20 (1750 ×) (region far from the notch, propagation zone) (b) 95/5 (1750 ×) induction zone.

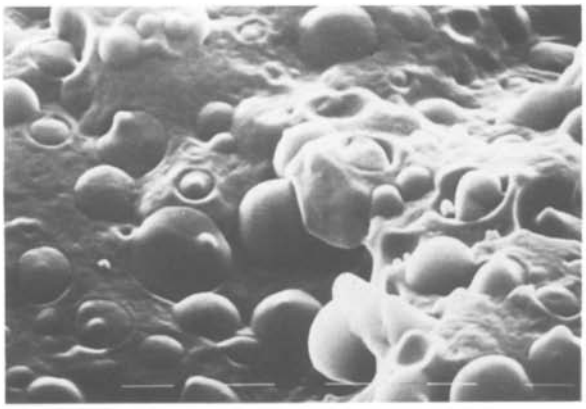

Figure 13 SEM micrograph of Izod fracture surface of 80/20 PA6/ Elvax 4320 blend (1710 ×) (region far from the notch, propagation zone).

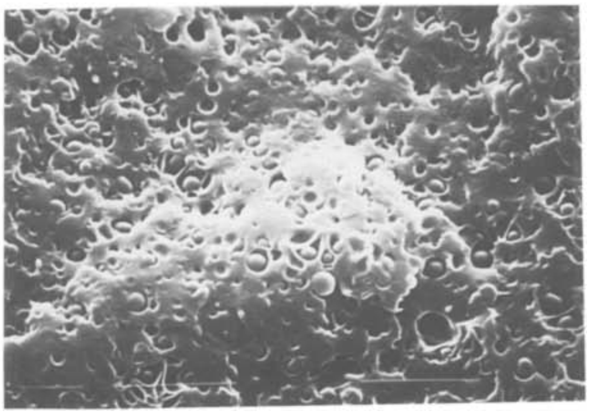

Figure 15 SEM micrograph of Izod fracture surface of 90/10 PA6/ Elvax 250 blend (induction region 3800 ×).

matrix and dispersed phase. Furthermore it is to be noted that a content of about 40% (wt/wt) of vinylacetate induces a drastic drop in the crystallinity degree of the copolymer that behaves quite similar to an elastomer.

4. Concluding remarks

Studies concerning the formation of anisotropic skin-core morphology during injection moulding of plain semicrystalline polymers are reported in the literature [13]. Much less attention has been addressed to the study of the influence of injection moulding process on the mode and state of dispersion of a rubbery minor component into a semicrystalline matrix such as PA6.

From our investigations, performed on injection moulded bars of PA6 modified with different EVA copolymers and with an ethylene–vinylacetate–acrylic terpolymer, an anisotropic distribution of the dispersed phase with the presence of a skin layer free of minor component was observed.

It is interesting to observe that an anisotropic distribution of rubbery particles was found by Bianchi *et al.* [14] in samples of isotactic polypropylene/ poly(isobutylene) blends obtained simply by compression moulding. In such a case it was observed that the domains of dispersed phase are much more concentrated at the interspherulitic border regions.

The outer skin observed in PA6/EVA blends consists of an almost pure PA6 layer. The rubbery particles are contained in inner layers. It is to be noted moreover that the concentration of the dispersed phase increases with increasing distance from the skin toward the core of the samples. Such a dispersion mode of the minor component determines in turn a gradient in the overall crystallinity index. As a matter of fact the overall crystallinity index is lower at the inner core of the bar. This effect becomes more pronounced with increasing the copolymer content in the blend.

The average particle size, the particle size distribution as well as the adhesion between matrix and dispersed domains are found to be dependent on parameters such as chemical structure, molecular characteristics and melt viscosity of the impact modifier used.

The mode and the fracture mechanism of PA6/ Elvax injection moulded bars result to be dependent on the combination of shear yielding and multiple craze formation mechanisms. The entity of such prcesses and how they interact tend to be dependent mainly on the average particle size of dispersed Elvax domains. As a matter of fact it is found that the better impact behaviour is shown by PA6/Elvax 40 blend for which lower dimensions of dispersed particles were measured. In turn the fact that Elvax 40 is a comparatively better toughening agent is to be accounted for by the larger content of vinylacetate unit present along the copolymer chain and likely to an intermediate molecular mass and melt viscosity.

Figure 14 SEM micrograph of Izod fracture surface of 80/20 PA6/ Elvax 220 blend (30 ×).

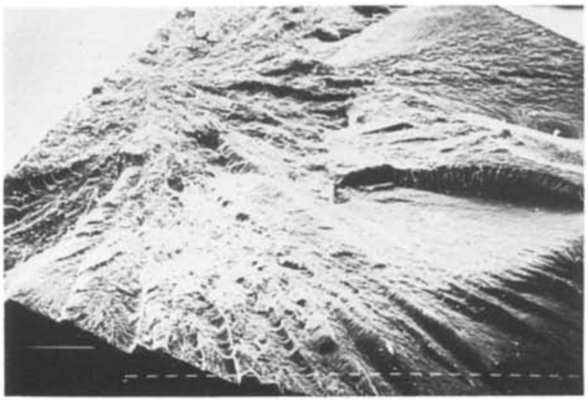

Figure 16 SEM micrograph of Izod fracture surface of 80/20 PA6/ Elvax 40 blend (30 ×).

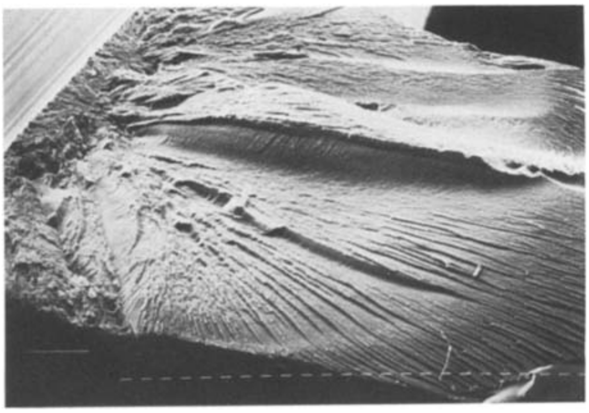

Figure 17 SEM micrograph of Izod fracture surface of plain PA6 (30 ×).

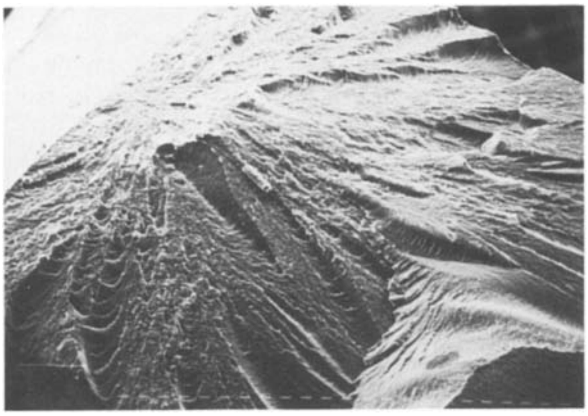

Figure 18 SEM micrograph of Izod fracture surface of 80/20 PA6/Elvax 250 blend (30 ×).

In the case of PA6/Elvax 4320 blends, a better adhesion was observed between terpolymer domains and matrix. This would explain the better impact behaviour of such blend in comparison with that containing Elvax 220. Nevertheless the impact behaviour of PA6/Elvax 4320 blend is not as good as blends containing Elvax 250 even though the dimensions of the particles are approximately the same. Such findings may be accounted for by the relatively lower glass transition temperature found for Elvax 250 copolymer. As a matter of fact it is well known that one of the factors determining the impact behaviour of rubber modified polymers is the difference between the glass transition of matrix and dispersed phase [10].

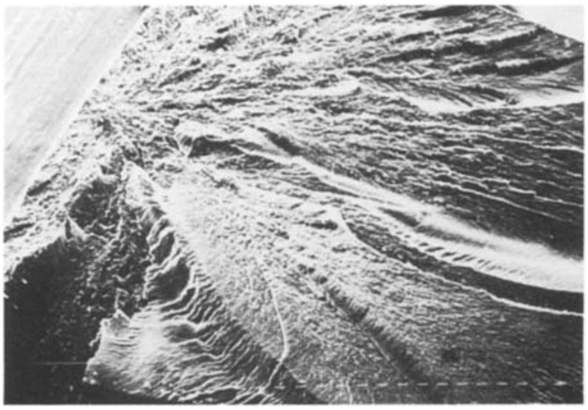

Figure 19 SEM micrograph of Izod fracture surface of 80/20 PA6/Elvax 4320 blend (30 ×).

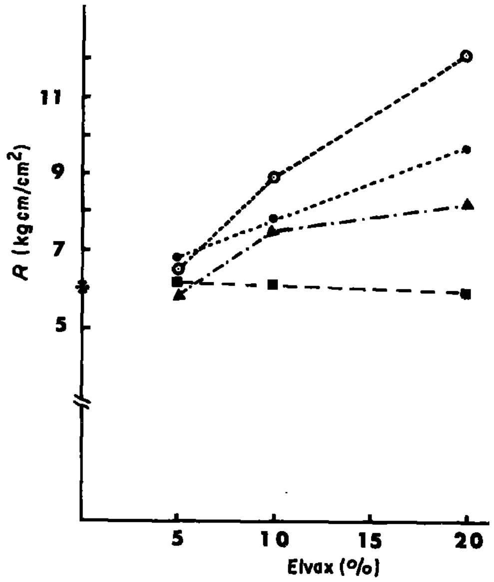

Figure 20 Izod impact strength values (R) for the PA6 and all examined blends as a function of composition. (○) Elvax 40; (●) Elvax 250; (▲) Elvax 4320; (■) Elvax 220; (∗) PA6.

From this study it can be concluded that the mechanical response of PA6/Elvax blends is mainly determined by a combination of factors such as phase viscosity ratio, molecular mass, molecular mass distribution, and molecular structure of copolymer, glass transition temperature as well as overall blend composition. Work is in progress to optimize one of these factors while the others are kept almost constant.

Acknowledgement

This work was partly supported by Progetto Finalizzato Chimica Fine of Italian CNR.

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Received 30 December 1985
and accepted 11 February 1986