

**POLYPROPYLENE RESIN COMPOSITION FOR METALLIZED FILM AND
METALLIZED FILM PREPARED THEREFROM**

BACKGROUND OF THE INVENTION

5 Field of the Invention

The present invention relates to a polypropylene resin composition for a metallized film, a film for metallization made thereof and a metallized film prepared therefrom. Particularly, the present invention relates to a polypropylene resin composition which provides a film excellent in adoptability of metallization, odorless, and not deteriorating taste of the foodstuff packed in a package made of the metallized film, to a polypropylene resin composition film thereof for metallization and to a metallized polypropylene resin composition film prepared therefrom.

Description of Related Art

A polypropylene film has excellent transparency, mechanical strength and heat resistance and has been used for a packaging material due to such suitable properties, and an additive such as an antioxidant is added thereto for use of a packaging film. And, the polypropylene film is subjected to deposition of metallic material such as aluminum in order to give a gas barrier property or light screening property, and used as a metallized film, further, subjected to printing thereon, and laminated with other film(s) for practical use. It happens, however, that the wetting tension

of the surface on which metallic material has been metallized is lowered during the storage period causing problems in the subsequent process of printing or lamination after a period of storage. Thus, a polypropylene film with an excellent
5 adaptability for aluminum metallization has been developed.

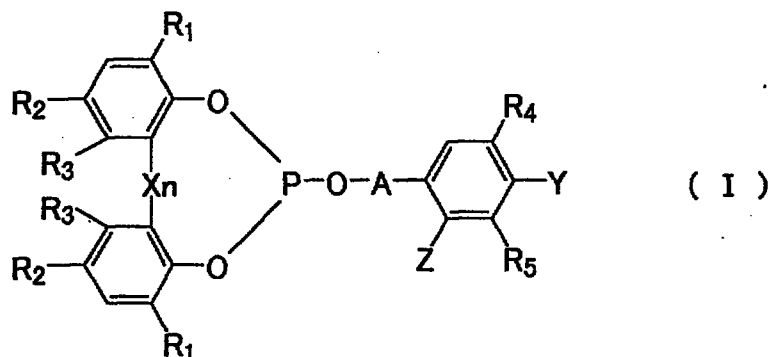
In JP59-011249A, for example, it is disclosed that a film is made of a resin composition containing 0.1 to 0.2 parts by weight of an antioxidant with a melting point higher than 80°C and 0.01 to 0.5 parts by weight of an anti-blocking
10 agent are added to a polypropylene resin and that an aluminum metallization film is obtained where the soluble fraction of the film in a cold xylene is less than 5% by weight. It happened, however, that the film for aluminum metallization is insufficient in processing stability and generates
15 unpleasant odor, and further tastes of some foodstuff which have contacted with the film is deteriorated. Additionally, in a case of use for printing on the film for aluminum metallization or laminating another film therewith, problems with respect to the printing or the lamination with other
20 film(s) during storage sometimes occurred.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a polypropylene resin composition film for metallization having
25 an excellent adaptability for metallization and little odor and further not deteriorating the taste.

Namely, the present invention relates to a

polypropylene resin composition for a film for metallization,
 comprising 100 parts by weight of a polypropylene resin and
 0.01 to 1 part by weight of a phosphite represented by the
 general formula (I) to 100 parts by weight of the polypropylene
 5 resin.



(wherein R^1 , R^2 , R^4 and R^5 individually represent a hydrogen
 atom, alkyl group having 1 to 8 carbon atoms, cycloalkyl group
 having 5 to 8 carbon atoms, alkylcycloalkyl group having 6
 10 to 12 carbon atoms, aralkyl having 7 to 12 carbon atoms or
 phenyl group, respectively; R^3 represents a hydrogen atom or
 alkyl group having 1 to 8 carbon atoms; X represents a sulfur
 atom or $-\text{CHR}^6-$ group (R^6 is a hydrogen atom, alkyl group having
 1 to 8 carbon atoms or a cycloalkyl group having 5 to 8 carbon
 15 atoms); n is 0 or 1; A represents an alkylene group having
 2 to 8 carbon atoms or a $^*\text{-CO}(\text{R}^7)_m-$ group (R^7 is an alkylene
 group having 1 to 8 carbon atoms, * mark is indicative of
 the bonding site of A to oxygen atom, and m is 0 or 1.); and
 either one of Y or Z is a hydroxy group, alkoxy group having
 20 1 to 8 carbon atoms, or aralkyloxy group having 7 to 12 carbon
 atoms and the other is a hydrogen atom or alkyl group having

1 to 8 carbon atoms.), a polypropylene resin composition film for decomposition made thereof, and a metallized polypropylene resin composition film.

The present invention will be described in more detail
5 below.

DETAILED DESCRIPTION OF THE INVENTION

The polypropylene resin used in the present invention is a homopolymer or copolymer obtained by polymerization of
10 propylene or monomers containing mainly propylene. The polypropylene resin includes, for example, a propylene homopolymer, propylene-ethylene random copolymer, propylene- α -olefin having 4 to 12 carbon atoms random
15 copolymer, propylene-ethylene- α -olefin having 4 to 12 carbon atoms random ternary copolymer, polypropylene copolymer (sometimes called as a propylene-ethylene block copolymer) composed of a polymer component obtained by polymerizing mainly propylene in a first step and a copolymer component obtained by subsequently copolymerizing propylene and
20 ethylene and/or the α -olefin in a second or later steps. Among them, a propylene homopolymer, propylene-ethylene random copolymer, propylene- α -olefin random copolymer, propylene-ethylene- α -olefin three elements copolymer are preferable. The polymers may be used alone or in combination
25 of two or more of the propylene polymers.

The α -olefin includes α -olefins having 4 to 12 carbon atoms, and specific examples thereof include, for example,

1-butene, 2-methyl-1-propylene, 1-pentene,
 2-methyl-1-butene, 3-methyl-1-butene, 1-hexene,
 2-ethyl-1-butene, 2,3-dimethyl-1-butene,
 2-methyl-1-pentene, 3-methyl-1-pentene, 4-methyl-1-pentene,
 5 3,3-dimethyl-1-butene, 1-heptene, methyl-substituted
 -1-hexenes, dimethyl-substituted-1-pentenenes, 1-octene,
 methyl-substituted-1-pentenenes, ethyl-
 substituted-1-hexenes, dimethyl substituted-1-hexenes,
 propyl substituted-1-heptenes, methyl,ethyl-
 10 substituted-1-heptenes, trimethyl-substituted-1-pentenenes,
 propyl-substituted-1-pentenenes, diethyl-
 substituted-1-butenes, 1-nonene, 1-decene, 1-undecene,
 1-dodecene. Among the α -olefins, 1-butene, 1-pentene,
 1-hexene and 1-octene are preferable and still more preferable
 15 are 1-butene and 1-hexene from the viewpoints of
 copolymerization characteristics and production cost.

The content of the unit derived from ethylene and/or
 α -olefin having 4 to 12 carbon atoms in the copolymer is not
 particularly limited, but, it is usually from 0.1 to 20 %
 20 by weight and preferably from 0.1 to 10 % by weight.
 Herein, when ethylene and the α -olefin were used, the content
 means a total content of ethylene and the α -olefin.

From the viewpoint of adaptability to metallization,
 the amount of 20°C-xylene soluble fraction of the polypropylene
 25 resin used is preferably less than 7 % by weight, and more
 preferably less than 5 % by weight.

The method of producing the polypropylene resin used

in the present invention is not particularly limited, and the polypropylene resin is produced by a known method using a known catalyst.

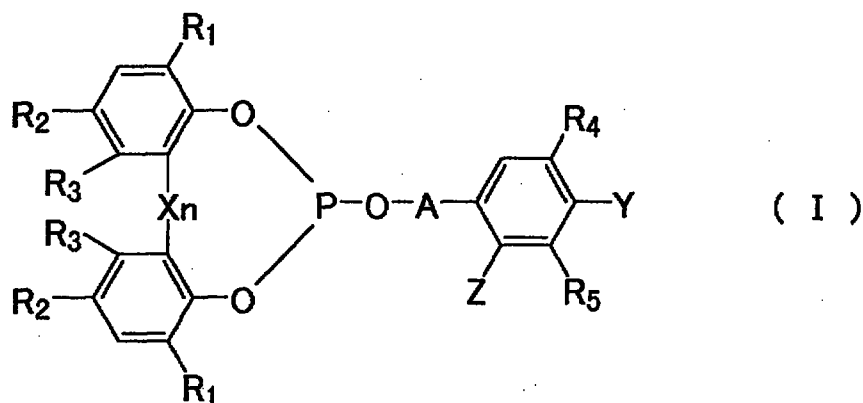
As a known catalyst, for example, there are used a Ti-Mg catalyst system comprising a solid catalyst component which is a magnesium compound combined with Ti compound, a catalyst system composed of the aforementioned solid catalyst component, an organoaluminum compound and optionally an electron donor as a third component, and a metallocene catalyst system. A catalyst system obtained by combining a solid catalyst component containing Mg, Ti and a halogen as essential components, an organoaluminum compound and an electron donor, is preferable. The preferable catalyst systems are described in JP61-218606A, JP61-28790A, JP07-216017A and the like.

As a method of polymerization, for example, slurry polymerization using an inert hydrocarbon solvent, solution polymerization, bulk polymerization without a solvent, and gas phase polymerization or a liquid phase-gas phase polymerization in which the liquid phase and a vapor phase polymerizations are carried out sequentially. The gas phase polymerization is preferable.

In the production of polypropylene used in the present invention, the propylene may be dried at a temperature lower than that at which the polypropylene is melted, to remove a residual solvent and a oligomer having an ultra low molecular weight as a by-product and the like. Such methods of drying are described, for example, in JP550755410 A and JP2565753B2.

The melt flow rate (MFR) of the polypropylene used in the present invention is not particularly restricted. It is, however, that MFR is preferably within a range from 0.1 to 50g/10min., and more preferably from 1 to 20g/10min., from the viewpoint of fluidity and film forming property.

The phosphite used in the present invention is represented by the following general formula (I):



(wherein R^1 , R^2 , R^4 and R^5 individually represent a hydrogen atom, alkyl group having 1 to 8 carbon atoms, cycloalkyl group having 5 to 8 carbon atoms, alkylcycloalkyl group having 6 to 12 carbon atoms, aralkyl having 7 to 12 carbon atoms or phenyl group, respectively; R^3 represents a hydrogen atom or alkyl group having 1 to 8 carbon atoms; X represents a sulfur atom or $-CHR^6-$ group (R^6 is a hydrogen atom, alkyl group having 1 to 8 carbon atoms or a cycloalkyl group having 5 to 8 carbon atoms); n is 0 or 1; A represents an alkylene group having 2 to 8 carbon atoms or $*-CO(R^7)_m-$ group (R^7 is an alkylene group having 1 to 8 carbon atoms, * mark is indicative of the bonding site of A to oxygen atom, and m is 0 or 1.); and either one of Y or Z is a hydroxy group, alkoxy group having

1 to 8 carbon atoms, or aralkyloxy group having 7 to 12 carbon atoms and the other is a hydrogen atom or alkyl group having 1 to 8 carbon atoms.)

In the phosphite represented by the formula (I), the
5 respective groups R^1 , R^2 , R^4 and R^5 are independently a hydrogen atom, an alkyl group having 6 to 12 carbon atoms, a cycloalkyl group having 6 to 12 carbon atoms and an aralkyl having 7 to 12 carbon atoms or a phenyl group, respectively. The groups R^1 , R^2 , and R^4 are preferably an alkyl group having 1 to 8
10 carbon atoms, a cycloalkyl group having 5 to 8 carbon atoms, alkylcycloalkyl group having 6 to 12 carbon atoms and R^5 is a hydrogen atom, an alkyl group having 1 to 8 carbon atoms and a cycloalkyl group having 6 to 12 carbon atoms, preferably. Typical examples of the alkyl group having 1 to 8 carbon atoms
15 include, for example, a methyl group, ethyl group, n-propyl group, i-propyl group, n-butyl group, i-butyl group, sec-butyl group, t-butyl group, t-pentyl group, i-octyl group, t-octyl group, 2-ethylhexyl group and the like. Typical examples of the cycloalkyl group having 5 to 8 carbon atoms include, for
20 example, a cyclopentyl group, cyclohexyl group, cycloheptyl group, cyclooctyl group and the like, and further typical examples of the alkylcycloalkyl group having 6 to 12 carbon atoms include, for example, 1-methylcyclopentyl group, 1-methylcyclohexyl group, 1-methyl-4-i-propylcyclohexyl
25 group. Typical examples of aralkyl group having 7 to 12 carbon atoms include, for example, benzyl group, α -methylbenzyl group, α, α -dimethylbenzyl group.

Among these, R^1 and R^4 are preferably t-alkyl groups such as t-butyl group and t-octyl group, cyclohexyl group and 1-methylcyclohexyl group, respectively. R^2 is preferably an alkyl group having 1 to 5 carbon atoms such as a methyl group, ethyl group, n-propyl group, i-propyl group, n-butyl group, i-butyl group, sec-butyl group, t-butyl group and t-pentyl group. R^5 is preferably a hydrogen atom and an alkyl group having 1 to 5 carbon atoms such as a methyl group, ethyl group, n-propyl group, i-propyl group, n-butyl group, i-butyl group, t-butyl group and t-pentyl group.

R^3 represents a hydrogen atom or alkyl group having 1 to 8 carbon atoms. As the alkyl groups having 1 to 8 carbon atoms, for example, the same alkyl groups as previously described are included. R^3 is preferably a hydrogen atom or an alkyl group having 1 to 5 carbon atoms, and a hydrogen atom or methyl group is particularly preferred.

X represents that two groups having a phenoxy structure respectively are bonded directly when n is zero, and X represents a sulfur atom or a methylene group with which an alkyl group having 1 to 8 carbon atoms or a cycloalkyl group having 5 to 8 carbon atoms may be substituted when n is 1. Herein, the alkyl group having 1 to 8 carbon atoms and the cycloalkyl group include the same alkyl groups and cycloalkyl groups respectively as described previously. In the substituent X, it is preferable that n is zero, namely the two groups each of which has a phenoxy structure are bonded directly, or that n is 1 and a methylene group or a methylene

group substituted with a methyl group, ethyl group, n-propyl group, i-propyl group, n-butyl group, i-butyl group, t-butyl group or the like.

The substituent A represents an alkylene group having
 5 2 to 8 carbon atoms or $^*\text{-CO(R}^7)_m\text{-}$ group (R^7 represents an alkylene group having 1 to 8 carbon atoms, and *mark indicates a bonding site to oxygen atom and m is 0 or 1.).

Typical examples of the alkylene group having 2 to 8 carbon atoms include, for example, an ethylene group,
 10 propylene group, butylene group, pentamethylene group, hexamethylene group, octamethylene group, 2,2-dimethyl-1,3-propylene group. A propylene group is preferably used. Further, *mark in $^*\text{-CO(R}^7)_m\text{-}$ group indicate that the carbonyl is a bonding site to the oxygen atom of
 15 phosphite. Typical examples of the alkylene group having 1 to 8 carbon atoms in the substituent R^7 include, for example, groups of methylene, ethylene, propylene, butylene, hexamethylene, octomethylene, and 2,2-dimethyl 1,3-propylene. It is preferable that $^*\text{-CO(R}^7)_m\text{-}$ is either
 20 $^*\text{-CO-}$ group in which m is zero or $\text{-CO(CH}_2\text{CH}_2\text{)-}$ group where m is 1 and R^7 is ethylene.

Either one of X or Y represents a hydroxy group, alkoxy group having 1 to 8 carbon atoms or aralkyloxy group having 7 to 12 carbon atoms, and the other one represents a hydrogen
 25 atom or an alkyl group having 1 to 8 carbon atoms. More specifically, the alkyl group having 1 to 8 carbon atoms includes, for example, the same alkyl group as described

previously and the alkoxy group includes those alkoxy groups in which their alkyl moieties are the same as the above described alkyl group having 1 to 8 carbon atoms. Further the aralkyloxy group having 7 to 12 carbon atoms includes, for example, those
5 aralkyloxy groups in which their aralkyl moieties are the same as the aralkyl group having 7 to 12 carbon atoms.

The amount of the phosphite (I) used in the present invention is 0.01 to 1.0 part by weight per 100 parts by weight of polypropylene resin, and from the viewpoint of adaptability
10 to metallization, 0.01 to 0.5 parts by weight is preferable and 0.01 to 0.3 parts by weight is more preferable.

When the amount of the phosphite is less than 0.01 part by weight, the odor may generate and the taste of foods packed in a bag prepared from a film of the polypropylene may be
15 deteriorated due to insufficient processing stability. When the amount exceeds 1.0 part by weight, then adaptability to metallization may become worse and this is not economical since the used amount of the phosphite (I) increases.

To the resin composition used in the present invention,
20 other additives or other resins and elastomers may be added. The other additives include, for example, antioxidants, UV absorbers, antistatic agents, lubricating agents, nucleating agents, tackifiers, anti-clouding agents, anti-blocking agents and the like.

25 Other resins include polyolefin resins or elastomers such as various polyethylenes, polybutenes, ethylene- α -olefin copolymer elastomers. And these resins and

elastomers may be ones produced with a heterogeneous olefin polymerization catalyst system or a homogenous olefin polymerization catalyst system represented by a metallocene catalyst system. Furthermore, styrene-based copolymer elastomers produced by hydrogenation of styrene-butadiene-styrene block copolymer or of styrene-isoprene-styrene block copolymer, and the like are also listed.

The method of producing the resin composition includes a known method so far as a homogeneous composition can be obtained. For example, a method of compounding the polypropylene with the phosphite (I), and optionally the other additives and/or the other resin, and then mixing the admixture in a molten state, and the like are illustrated.

As the compounding method, there are illustrated, for example, a method of directly mixing polypropylene resin powder with phosphite (I) and optionally other additives with a mixing apparatus such as a Henschel mixer, a method of mixing a master batch of the polypropylene resin containing the additives of a high concentration, previously prepared with polypropylene resin powder, a method of adding the additives to the polypropylene resin in a molten state.

In addition, the other additives to be optionally added may be mixed with polypropylene resin together with the phosphite (I) or separately.

The apparatus used for melt-kneading is not particularly restricted and publicly known apparatus can be used.

Preferably, an extruder, a Banbury mixer, a batch type kneader or the like is used. It is preferable that the melt-kneading is carried out in an inert gas such as nitrogen or argon, and the temperature is lower than 300°C, and preferably from
5 180°C to 250°C.

The polypropylene film for metallization of the present invention may be either a single layered film made of the resin composition for metallization or a multi-layered film having a layer made of the resin composition for metallization.
10 In the case of the multi-layered film, other layer(s) is not restricted. It is, however, preferable that the other layer having no odor and not deteriorating the taste of the foodstuff contacting with the film, having a good adaptability to metallization, and not lowering the wetting tension of the
15 surface to be metallized when the film is stored in a wound state.

As a method of producing the polypropylene film for metallization of the present invention, there are listed a method of producing a single layered film by a known process
20 such as a inflation process, T-die process, calendering or the like, and a method of forming a film of the polypropylene resin for metallization film of the present invention as a layer of a multi-layered film, and laminating the film and a film made of another resin, and the like. The methods of
25 manufacturing the multi-layered film include an extrusion lamination method, hot lamination method, dry laminating method and the like which are generally used. Further, the

stretched film can be produced by stretching a pre-formed film or sheet. The stretching methods include a uniaxial or biaxial stretching method, for example, a roll stretching method, tenter stretching method, tubular stretching method and the like.

A metallic substance can be deposited on the surface of the polypropylene resin film for metallization of the present invention by, for instance, introducing a metallic vapor into a metallization apparatus where the film is placed under high vacuum. The metallic substance to be deposited includes aluminum, titanium, chromium, nickel, copper, germanium, tin, selenium and the like, and aluminum is preferred. The thickness of metallized aluminum membrane is not limited, but generally from 100Å to 1000Å and preferably from 300Å to 700Å.

EXAMPLE

The present invention is explained in more detail by way of the Examples and Comparative Examples, but is not limited thereto.

The methods of preparation of sample specimens used in the Examples and Comparative Examples, and the methods of measurements of properties are described below:

(1) The content of ethylene and 1-butene unit (unit: weight %) in the polypropylene resin.

The content of ethylene was measured according to the method for random copolymer described in page 616, "Polymer

Handbook" (published by Kinokuniya Shoten Co., Ltd. in 1995) based on the IR spectrum measurement.

The content of 1-butene was measured according to the method described in page 619, Polymer Handbook (published by Kinokuniya Shoten Co., Ltd. in 1995) based on the IR spectrum measurement.

(2) The 20°C-xylene soluble fraction in the polypropylene resin(unit: % by weight).

5 g of the polypropylene sample was dissolved in 500 ml of boiling xylene. After the resin sample had been completely dissolved, the solution was cooled to 20°C and allowed to stand for longer than 4 hours. Then, the precipitates were separated from the solution by filtration, the filtrate was dried at 70°C under reduced pressure, and the dried solid thus obtained was weighed.

(3) Melt Flow Rate (MFR, unit: g/10min.)

MFR was measured according to JIS K7210 at 230°C under a load of 21.18N.

(4) Odor Test

Two sheets of film samples of 10.5cm×12cm in size were placed in a vessel having an inner volume of 200ml with a cover of aluminum foil, and sample conditions were adjusted for 2 hours at 60°C in an air oven. After leaving the film samples for 30 minutes at room temperature, the degree of odor was tested by human organ. The degrees of odor were determined according to the following basis:

○: almost no smell

△: faintly smelled

×: strong odor sensed

(5) Taste Test

6.0g of rectangular film samples of 100mm×10mm in size
5 and 240ml of mineral water were placed in a vessel of 300ml
and the vessel was covered with a piece of aluminum foil,
and the film samples were boiled for 30 minutes. After leaving
over night, 50ml of water was poured into a cup and was subjected
to testing by human organ. The degrees of taste were determined
10 according to the following basis:

○: almost no taste

△: faintly tasted

×: clearly tasted

(6) Adaptability to metallization (wetting tension of
15 aluminum metallization surface, unit: dyne/cm)[Evaluation
test (6)]

The film of 18.5cm×18.5cm in size was placed over an
aluminum metallized surface of PET film of 20cm×20cm in size
so that the untreated surface of the film faces to the aluminum
20 metallized surface of the PET film, and it was kept under
a pressure of 32g/cm² at 45°C for 24 hours. After leaving
the samples at room temperature for more than 1 hour, the
wetting tension of the aluminum metallization surface of the
aluminum metallized PET film sample was measured. The wetting
25 tension of the aluminum metallization surface of the PET film
sample before testing was more than 54 dyne/cm.

The purpose of this test was to realize the changes of

wetting tension of the metallized surface when the polypropylene film for metallization of the present invention was stored in a roll form after the film was subjected to metallization treatment through simulation model.

- 5 Consequently, it is indicated that the higher the wetting tension, the larger the adaptability to the metallization.

(7) Adaptability to metallization (wetting tension of aluminum metallized surface, unit: dyne/cm) [Evaluation test (7)]

- 10 The film of 18.5cm×18.5cm in size was placed over an aluminum metallized surface of a film of 20cm×20cm in size so that the untreated surface of the film faces to the aluminum metallized surface of the film, and it was kept under a pressure of 32g/cm² at 45°C for 24 hours. After leaving the samples
15 at room temperature for more than 1 hour, the wetting tension of the aluminum metallized surface of the aluminum metallized film sample was measured. The wetting tension of the aluminum metallized surface of the film sample before testing was more than 54 dyne/cm.

20 Example 1

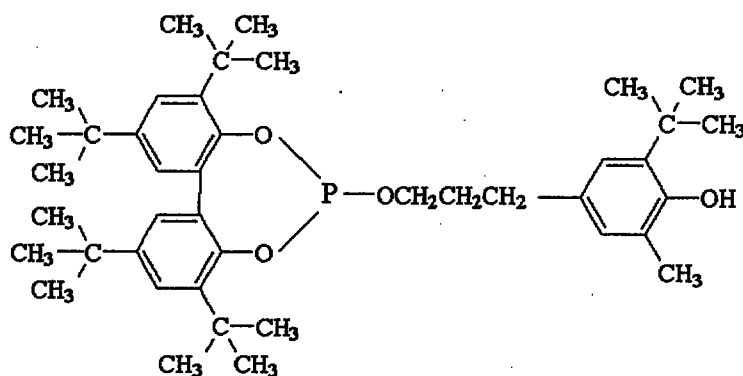
- To 100 parts by weight of a polypropylene resin (propylene-ethylene-1-butene random copolymer, ethylene unit content: 1.2 % by weight, 1-butane unit content: 4.0 % byweight, and 20°C-xylene soluble fraction: 1.3 % byweight),
25 0.05 parts by weight of the phosphite (1) described below, was added and mixed for 3 minutes using a Henschel mixer replaced with nitrogen therein. The mixture was fed to a nitrogen

substituted hopper and was melt-kneaded at set temperature of 220°C using a 40mm ϕ single screw extruder and then was pelletized. MFR was 8.0g/10min.

90 parts by weight of the pellet obtained was
5 dry-blended with 7 % by weight of MBO6B(polypropylene master batch containing silica fine powder of 2wt% as an anti-blocking agent, manufactured by Sumitomo Chemical Co., Ltd.) and 3 % by weight of G1900(high density polyethylene manufactured by Keiyo Polyethylene Co., Ltd) to obtain a mixture and a
10 film of 30 μ m in thickness was prepared by extruding the mixture at a resin temperature of 250°C and a discharge rate of 12 kg/hr with a 50mm ϕ extruder equipped with a coat-hanger type T-die of 400mm in width, cooling an extruded film at a chill roll temperature of 50°C and line velocity of 20m/min. with
15 an air-chamber type cooling system. One side of the surfaces of the resulting film was subjected to a corona discharge treatment. The results of the evaluation of the film according to Evaluation test (6) are shown in Table 1.

Phosphite compound (1):

20 6-[3-(3-t-butyl-4-hydroxy-5-methylphenyl)propoxy]-2,4,8,10-tetra-t-butylbenz[d,f][1,3,2]dioxaphosphin
(CAS No. 2032555-81-6) (Sumilizer GP, manufactured by Sumitomo Chemical Co., Ltd.)



Example 2

Pellet was prepared in the same manner as in Example 1 except that 0.10 part by weight of the phosphite (1) was used. MRF of the pellet was 7.3g/10min. A film was prepared in the same manner as in Example 1 except using the pellet, and evaluated. The results of the evaluation of the film according Evaluation test (6) are shown in Table 1.

Comparative Example 1

Pellet was prepared in the same manner as in Example 1 except that 0.125 part by weight of Irganox 1010 (manufactured by Ciba Specialty Chemicals, Ltd.) was used instead of the phosphite(I). MRF of the pellet was 8.8g/10min. A film was prepared in the same manner as in Example 1 except using the pellet, and evaluated. The results of the evaluation of the film according Evaluation test (6) are shown in Table 1.

Comparative Example 2

Pellet was prepared in the same manner as in Example 1 except that 0.125 part by weight of Irganox 1010 (manufactured by Ciba Specialty Chemicals, Ltd.) and 0.05 parts by weight of Irgafos (manufactured by Ciba Specialty Chemicals, Ltd.)

were used instead of the phosphite(I). MRF of the pellet was 7.6 g/10min. A film was prepared in the same manner as in Example 1 except using the pellet, and evaluated. The results of the evaluation of the film according Evaluation test (6) are shown in Table 1.

Table 1

	Odor test	Taste test	Wetting tension of aluminum surface to be metallized (dyne/cm)
Example 1	○	○	45
Example 2	○	○	45
Comparative example 1	×	△	41
Comparative example 2	△	×	41

Example 3

A film was prepared in the same manner as in Example 1. Al metallization was carried out on a corona-treated film surface under conditions of 180A of electric current (ceramic electrode), under a vacuum of 2×10^{-5} Torr at an Al feeding rate of 8 scale and winding rate of 10 rpm (2.9 m/minute) using a vacuum metallization apparatus (P-59 type manufactured by SATO SHINKU Co., Ltd.).

The adaptability to metallization of thus obtained metallized film was evaluated according to Evaluation test

(7). The wetting tension of the film was 46 dyne/cm.

Example 4

A film was prepared in the same manner as in Example 2. This film was subjected to Al metallization and evaluation
5 in the same manner as in Example 3. The wetting tension of the film was 45 dyne/cm.

Comparative Example 3

A film was prepared in the same manner as in Comparative Example 1. This film was subjected to Al metallization and
10 evaluation in the same manner as in Example 3. The wetting tension of the film was 41 dyne/cm.

Comparative Example 4

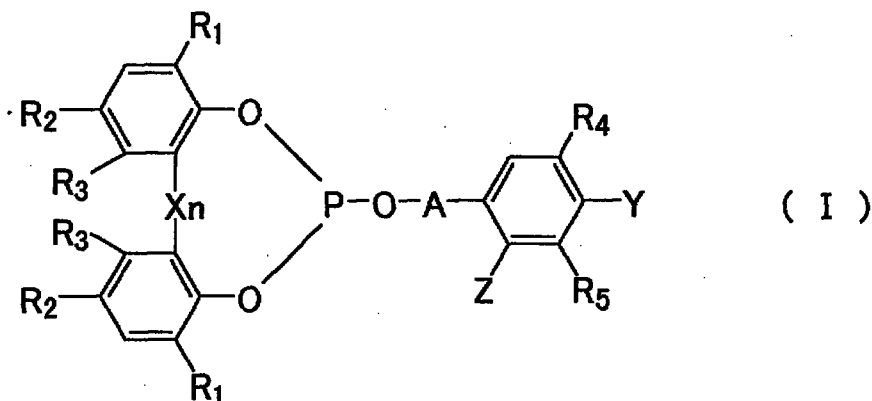
A film was prepared in the same manner as in Comparative Example 2. This film was subjected to Al metallization and
15 evaluation in the same manner as in Example 3. The wetting tension of the film was 40 dyne/cm.

According to the present invention, a polypropylene resin composition for metallized film, a film made thereof for metallization having an excellent adaptability to
20 metallization and having no inferior effect to other materials contacting the film in respect to odor and taste and a metallized film prepared therefrom, are provided.



CLAIMS

1. A polypropylene resin composition for a metallized film, which comprises 100 parts by weight of a polypropylene resin and 0.01 to 1 part by weight of a phosphite represented
5 by the general formula (I):



- (wherein, R^1 , R^2 , R^4 and R^5 represent individually a hydrogen atom, alkyl group having 1 to 8 carbon atoms, cycloalkyl group having 5 to 8 carbon atoms, alkylcycloalkyl group having 6
10 to 12 carbon atoms, aralkyl group having 7 to 12 carbon atoms or phenyl group, respectively; R^3 represents a hydrogen atom or alkyl group having 1 to 8 carbon atoms; X represents sulfur atom or a $-CHR^6-$ group (R^6 represents hydrogen atom, an alkyl group having 1 to 8 carbon atoms or a cycloalkyl group having
15 5 to 8 carbon atoms); n is 0 or 1; A is an alkylene group with 2 to 8 carbon atoms or a $^*-CO(R^7)_m-$ group (R^7 is an alkylene group with 1 to 8 carbon atoms, * mark is indicative of the bonding site of A to oxygen atom and m is 0 or 1); and either
20 one of Y or Z is a hydroxy group, alkoxy group having 1 to 8 carbon atoms, or an aralkyloxy group having 7 to 12 carbon atoms and the other is a hydrogen atom or alkyl group having

1 to 8 carbon atoms.)

2. The polypropylene resin composition according to claim 1, wherein the amount of the phosphite is 0.01 to 0.5 parts by weight.

5 3. A polypropylene resin composition film for metallization made of the polypropylene resin composition of claim 1 or 2.

4. The polypropylene resin composition film according to Claim 3, wherein the polypropylene resin film is a
10 polypropylene resin composition film for aluminum metallization.

5. A metallized polypropylene resin composition film obtained by depositing a metal substance on the surface of the polypropylene resin composition film of claim 3.

15 6. The metallized polypropylene resin composition film according to claim 5, wherein the metal substance is aluminum.

