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(72) Inventeurs/Inventors:
CHO, SUN-NY, KR;
PARK, JE-HWAN, KR

(73) Propriétaire/Owner:
KUMHO TIRE CO., INC., KR

(74) Agent: BORDEN LADNER GERVAIS LLP

(54) Titre : COMPOSITION DE CAOUTCHOUC ODORANTE POUR PNEU
(54) Title: FRAGRANCE-EMITTING RUBBER COMPOSITION FOR TIRE

(57) Abrégé/Abstract:
Disclosed is a fragrance-emitting rubber composition for tire treads, which contains, in addition to the prior rubber composition for tire treads, a fragrance. Preferably, the fragrance contained in the tire tread rubber composition is an oil-type fragrance that maintains more than 90% of its fragrant component even at a temperature of 170-180 °C, which is the temperature for tire processing. Also, a tire having a tread comprising the fragrance-emitting rubber composition is disclosed. The fragrance-emitting rubber composition for tire tread may contain the fragrance in an amount of 0.1-20 phr based on 100 phr of a raw material rubber.

ABSTRACT

Disclosed is a fragrance-emitting rubber composition for tire treads, which contains, in addition to the prior rubber composition for tire treads, a fragrance. Preferably, the fragrance contained in the tire tread rubber composition is an oil-type fragrance that maintains more than 90% of its fragrant component even at a temperature of 170-180 °C, which is the temperature for tire processing. Also, a tire having a tread comprising the fragrance-emitting rubber composition is disclosed. The fragrance-emitting rubber composition for tire tread may contain the fragrance in an amount of 0.1-20 phr based on 100 phr of a raw material rubber.

FRAGRANCE-EMITTING RUBBER COMPOSITION FOR TIRE

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a fragrance-emitting rubber composition for tire, and more particularly to a fragrance-emitting rubber composition for a tire, which contains a fragrance in addition to a conventional rubber composition for tire.

Description of the Prior Art

Rubber compositions for manufacturing tires contain rubber, sulfur, additive chemicals, etc., which emit bad smells during processes of manufacturing tires and from tire products. Also, tires often smell bad due to heat generated during use thereof.

The smell during tire manufacturing processes can be somewhat improved by diffusing fragrances in the process atmosphere. However, the use of fragrances to improve the smell of tire products has been limited for several reasons. That is, the use of fragrances in tires was unsuitable because it can deteriorate the properties of tires and increase the production cost, and fragrance causes only a subjective difference, having no standard for measurement, and the

toxicity to humans has not yet been verified.

Furthermore, current regulations on harmful substances for fragrances stipulate that fragrances be prepared using only raw materials approved for use by the IFA(International Fragrance Administration). Thus, the safety of fragrances with respect to the human body cannot be guaranteed.

As the demand for automobiles increases and the preferences of drivers vary, preferences for tires also vary and the designs and required properties of tires that cause automobiles to look elegant become diverse.

Although design of the prior tires have emphasized visual factors, efforts to impart tires with olfactory properties in addition to visual properties have also been made. As a part of such efforts, there has been an effort to realize the emission of fragrance from tires by adding fragrances to raw material rubber for tires in the manufacturing of tires.

In this case, general fragrances together with fragrance retention agents are added during the manufacturing of tires in order to maintain the fragrance for a long time using the retention agents, because the general fragrances are completely volatilized at a temperature of about 70 °C. However, there is a problem in that the general fragrances or retention agents do not remain after the vulcanization of tires.

SUMMARY OF THE INVENTION

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a fragrance-emitting rubber composition for tire, which contains an oil-type fragrance which maintains more than 90% of its fragrant component even at 170-180 °C, which is a temperature for tire processing.

Another object of the present invention provides a tire comprising a fragrance-emitting rubber composition containing said fragrant component.

When the fragrance-emitting rubber composition according to the present invention is used in a tire tread, which continues to wear in direct contact with the ground surface, the fragrance from the tire tread can be maintained for a long time even in the use of a fragrance which is not as strong as the other components of the tire, owing to the wear of the tire tread. In case of sidewall, the fragrance also can be maintained for a longtime because flexible sidewall builds heats less than the other components.

The present invention provides a fragrance-emitting rubber composition for a tire (tire treads, sidewall and etc.), which comprises a fragrance in an amount of 0.1 - 20 phr based on 100 phr of raw

material rubber.

More particularly, the present invention provides a fragrance-emitting rubber composition for tire, comprising a fragrance in an amount of 0.1-20 phr based on 100 phr of a raw material rubber, wherein the fragrance has a specific gravity of 0.5-2.0 at 20°C and a refractive index of 0.1-2.0 at 20°C, and is an oil-type fragrance, which maintains more than 90% of its fragrant component even at a temperature of 160-170 °C, which is the temperature for tire processing, as measured by a thermogravimetric analyzer (TGA), and wherein the fragrance is a p-methyl acetophenone, cinnamic acid, Ω-bromostyrene, cinnamic acid ester, phenyl glycidate ester, α-alkyl cinnamic aldehyde, cinnamic aldehyde, dihydrocinnamic aldehyde, cinnamic alcohol, cinnamic ester, dihydrocinnamic alcohol, dihydrocinnamic ester, benzal acetone, diphenyl methane, phenyl acetic acid, phenyl acetic acid ester, tonalid, terpineol, terphenyl acetate, methanyl acetate, sandal compound, isobonyl acetate, dihydro myrcenol, linalool, linalyl ester, linalyl acetate, myrcenol, lyral, nerol, menthol, lonone, methyl lonone, allyl amyl glycolate, tricyclodecenyl acetate, N-hexyl salicylate or hedione.

DETAILED DESCRIPTION OF THE INVENTION

As the raw material rubber, any rubber may be used in the present invention, as long as it can be used as raw material rubber in the prior rubber compositions for tire.

As one example of the raw material rubber in the present invention, natural rubber may be used alone.

As one example of the raw material rubber in the present invention, each of synthetic rubbers, such as styrene-butadiene rubber, butadiene rubber, isoprene-containing styrene-butadiene rubber, nitrile-containing styrene-butadiene rubber, and neoprene rubber may be used alone. Alternatively, a 1:9-9:1 mixture of two or more of these synthetic rubbers may be used.

As one example of the raw material rubber in the present invention, a 1:9-9:1 mixture of natural rubber and synthetic rubber may be used.

In the inventive fragrance-emitting rubber composition, the fragrance component can be contained in an amount of 0.1-20 phr based on 100 phr of the raw material rubber.

If the fragrance is used in an amount of less than 0.1 phr based on 100 phr of the raw material rubber, the fragrance will not be sufficiently emitted, and if it is used in an amount of more than 20 phr based on 100 phr of the raw material rubber,

it can deteriorate the physical properties of the rubber. For this reason, it is preferable that the fragrance be contained in an amount of 0.1-20 phr based on 100 phr of the raw material rubber.

As the fragrance in the present invention, a natural or synthetic fragrance can be used. Preferred is an oil-type fragrance, which maintains more than 90% of its fragrant component even at a temperature of 170-180 ℃, which is the temperature for tire processing, as measured by a thermogravimetric analyzer (TGA), and is highly resistant to heat and emits a strong fragrance for a long time.

Examples of the natural fragrance, which can be used in the present invention, include vegetable fragrances and animal fragrances.

The synthetic fragrance can be synthesized from an aromatic component obtained from plant essence, petroleum or coal.

The fragrance used in the present invention may have a specific gravity of 0.5-2.0 at 20 ℃ and a refractive index of 1.0-2.0 at 20 ℃.

The fragrance used in the present invention may comprise any one or more selected from the group consisting of p-methyl acetophenone, benzoic acid ester, benzaldehyde, cinnamic acid, Ω-bromostyrene, cinnamic acid esters, phenyl glycidate ester, α-alkyl cinnamic aldehyde, cinnamic aldehyde, dihydrocinnamic

aldehyde, cinnamic alcohol, cinnamic esters, dihydrocinnamic alcohol, dihydrocinnamic esters, benzal acetone, dimethyl β-phenylethyl carbinol, trichloro methyl benzyl acetate, benzyl alcohol, benzyl esters, benzyl acetate, benzyl salicylate, diphenyl methane, phenyl acetic acid, phenyl acetic acid ester, dimethyl benzyl carbinol, dimethyl benzyl carbonyl acetate, tonalid, lilial, terpineol, terphenyl acetate, methanyl acetate, sandal compounds, isobonyl acetate, dihydro myrcenol, linalool, linalyl ester, linalyl acetate, myrcenol, lyral, geranlol, nerol, geranyl ester, citronellol, citronellal, menthol, hydroxy citronellal, citronellyl ester, citral, lonone, methyl lonone, allyl amyl glycolate, tricyclodecenyl acetate, cyclal C, N-hexyl salicylate, and hedione.

In addition to the raw material rubber and fragrance as described above, the inventive rubber composition for tire may, if necessary, contain suitable amounts of various additives used in the prior tire rubber composition, such as reinforcing agents, activating agents, antioxidants, processing oil, vulcanizing agents, and vulcanization accelerators. However, a detailed description of these additives will be omitted herein, because these additives are general components used in the prior tire rubber compositions and are not essential components in the present invention.

In another aspect, the present invention provides a tire comprising the inventive tire rubber composition. The

inventive tire is any one selected from the group consisting of automobile tires, truck tires and bus tires.

Hereinafter, the present invention will be described in detail using comparative examples, examples and test examples. It is to be understood, however, that these examples are for illustrative purpose and are not construed to limit the scope of the present invention.

Example 1

Styrene-butadiene rubber was used as a raw material rubber. 100 phr of the raw material rubber was compounded with 80 phr of carbon black (N330), 3 phr of zinc oxide, 2 phr of stearic acid, 2.75 phr of 2,2,4-trimethyl-1,2-dihydroquinoline as an antioxidant, 2 phr of wax, 15 phr of processing oil and 0.7 phr of a fragrance in a Banbury* mixer at 150 °C for 30 minutes.

To the compounded material, 2 phr of sulfur as a vulcanizing agent and 2.3 phr of N-butylbenzothiazole sulfenamide (NS) as a vulcanization accelerator were then added, and the mixture was vulcanized at 160 °C for 20 minutes, thus preparing a fragrance-emitting rubber.

As the fragrance, a fragrance (lavender fragrance) containing linalyl acetate and linalool and having a specific gravity of 0.928-0.948 at 20 °C and a refractive index of 1.443-1.463 at 20 °C was used.

* Trade-mark

Example 2

A fragrance-emitting rubber was prepared in the same manner as in Example 1, except that the fragrance was used in an amount of 5 phr.

Comparative Example

A rubber was prepared in the same manner as in Example 1, except that the fragrance was not used.

Table 1: Composition of Examples and Comparative Example

Components	Example 1	Example 2	Comparative Example
Raw material rubber	100	100	100
Carbon black	80	80	80
Zinc oxide	3.0	3.0	3.0
Stearic acid	2.0	2.0	2.0
Antioxidant	2.75	2.75	2.75
Wax	2.0	2.0	2.0
Processing oil	15	15	15
Fragrance	0.7	5.0	-
Sulfur	2.0	2.0	2.0
Vulcanizing accelerator	2.3	2.3	2.3

Test example 1

The rubbers prepared in Examples 1 and 2 and Comparative Example was measured for their physical properties according to relevant ASTM standards, and the results are shown in Table 2 below.

Table 2: Measurement results for physical properties

Test items		Example 1	Example 2	Comparative Example
Specific gravity	SG	1.16	1.18	1.16
RHEO (160 °C)	TOQ (Max)	29.2	30.4	30.7
	T40	6.01	5.34	6.55
	T90	8.54	8.28	9.35
	EC (end cure)	9.39	9.46	10.29
ML (125 °C)	Viscosity	48.5	58	49.4
	T05	24.8	20.53	27.2
Tensile properties	Hardness	67	67	68
	300% modulus	140	132	144
	Tensile strength	199	183	203
	Elongation	408	402	404
DIN wear	(g)	0.115	0.114	0.113
PICO wear	(g)	0.0175	0.0173	0.0185
F.T.F.	(cycles)	70300	73700	77620
DMFC (7,000 Cycles)	Width (mm)	10.3	9.9	10.1
	Length (mm)	7.4	6.2	6

Test Example 2

Whether each of the rubbers prepared in Examples 1 and 2 and Comparative Example emitted fragrance was measured, and the results are shown in Table 3 below.

For this purpose, sensory panels comprising 20 peole(10 men and 10 women) were made to smell each of the rubbers, and the results are shown in Table 3.

Table 3: Measurement of fragrance

Item	Example 1	Example 2	Comparative Example
Smell	Weak emission of fragrant smell	Strong Emission of fragrant smell	General rubber smell

As can be seen from the results of Test Example 1, the fragrance-emitting rubbers of Examples 1 and 2 according to the

present invention are equal or better in physical properties than those of the Comparative Example consisting of the general rubber composition. Also, as can be seen from the results of Test Example 2, the fragrance-emitting rubbers of Examples 1 and 2 emit fragrance without smelling like rubber, whereas the rubber of Comparative Example has only the general rubber smell.

Namely, it will be known that the inventive rubber containing the fragrance emits a particular fragrance depending on the components of the fragrance.

Although a preferred embodiment of the present invention has been described for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of the invention as disclosed in the accompanying claims.

CLAIMS:

1. A fragrance-emitting rubber composition for tire, comprising a fragrance in an amount of 0.1-20 phr based on 100 phr of a raw material rubber,

wherein the fragrance has a specific gravity of 0.5-2.0 at 20°C and a refractive index of 0.1-2.0 at 20°C, and is an oil-type fragrance, which maintains more than 90% of its fragrant component even at a temperature of 160-170°C, which is the temperature for tire processing, as measured by a thermogravimetric analyzer (TGA), and

wherein the fragrance is a p-methyl acetophenone, cinnamic acid, Ω-bromostyrene, cinnamic acid ester, phenyl glycidate ester, α-alkyl cinnamic aldehyde, cinnamic aldehyde, dihydrocinnamic aldehyde, cinnamic alcohol, cinnamic ester, dihydrocinnamic alcohol, dihydrocinnamic ester, benzal acetone, diphenyl methane, phenyl acetic acid, phenyl acetic acid ester, tonalid, terpineol, terphenyl acetate, methanyl acetate, sandal compound, isobonyl acetate, dihydro myrcenol, linalool, linalyl ester, linalyl acetate, myrcenol, lyral, nerol, menthol, lonone, methyl lonone, allyl amyl glycolate, tricyclodecenyl acetate, N-hexyl salicylate or hedione.

2. The rubber composition of claim 1, wherein the composition is for tire treads.

3. The rubber composition of claim 1, wherein the composition is for tire sidewall.

4. A tire comprising a fragrance-emitting rubber composition as set forth in any one of claims 1 to 3.