

MINT POLYURETHANE FOAM INSOLE WITH COOLING AND ITCH-RELIEVING EFFECT, PREPARATION METHOD THEREFOR AND APPLICATION THEREOF

TECHNICAL FIELD

5 The present application belongs to the technical field of polyurethane insoles, for example, a mint polyurethane foam insole with a cooling and itch-relieving effect, a preparation method therefor and an application thereof.

BACKGROUND

10 The footwear is an indispensable article for daily use in life and work, and the insole is an important part of the footwear, so the importance of the insole lies in its direct impact on the comfort of the footwear. At present, the insoles sold in the market are generally made of cotton cloth, which are comfortable to wear, but the phenomenon of cotton insole getting wet and causing foot odor due to the absorption of foot sweat is quite common, especially for feet that are prone to sweating; at the same time, dampness encourages bacteria inside the shoe to grow and reproduce, which have a greater impact on the feet; in addition, most of the insoles are made of 15 plastics or macromolecular materials, but the simple plastics or macromolecular materials have poor moisture-absorption ability and also do not have an odor-absorbent and antimicrobial effect. Therefore, it has been a research focus in this field to prepare an insole with a moisture-absorbent, deodorant, and antimicrobial effect.

20 CN106388125A discloses a deodorant antimicrobial healthy Chinese herbal medicine PU insole, which comprises an upper wear-resistant layer, a lower wear-resistant layer, and a deodorant and antimicrobial layer located between the upper wear-resistant layer and the lower wear-resistant layer. Raw materials of the deodorant and antimicrobial layer comprise waste polyurethane, a pigment powder, tea polyphenol, a PU elastomer, cork particles, and a Chinese herbal medicine combination of rhubarb, sophorae, peach kernel, mint, borneol, a talcum powder, and agilawood. 25 The Chinese herbal medicine PU insole not only realizes the recycling of waste polyurethane, but also can fully exert the efficiency of the added various natural Chinese herbal components, which has a very good deodorant and antimicrobial effect; in the deodorant and antimicrobial layer of the Chinese herbal medicine PU insole of the invention, a PU foam layer is adopted; the PU foam layer has tens of thousands of ultra-fine, open, and interconnected honeycomb pores, 30 and has a strong capacity of moisture-absorption, permeability, and breathability, which can effectively solve the problems of high density, poor moisture-absorption and poor air

permeability of conventional EVA insoles.

CN112806667A discloses an industrial hemp Chinese herbal medicine foot-care massage health-care bacteriostatic insole and a preparation method therefor. The insole body comprises a polyurethane layer. The polyurethane layer has high wear resistance and light-weight. The polyurethane layer is laminated with an upper linen layer on the top and also a lower linen layer on the bottom, and the use of linen in the production process enhances the air permeability, bacteriostasis and water-absorption of the insole. The following raw materials are put into a cavity of the polyurethane layer: 1-3 g of lavender, 2-3 g of rosemary, 1-3 g of mint, 3-4 g of wormwood, 1-2 g of eucalyptus leaves, 1-2 g of a pearl powder, 3-4 g of cortex phellodendri, 3-4 g of radix sophorae flavescentis, 3-4 g of cortex pseudolaricis, 2-3 g of basil, and 2-3 g of lemongrass. The above Chinese medicine has the effect of tonifying spleen, tranquilization, clearing heat and removing toxin, warming meridians and unblocking collaterals, regulating qi and activating blood, removing toxin and dispersing swelling, so the insole using Chinese medicine plays a role in health preservation for the human body.

However, the insoles provided in the related art have poor sustainability of the deodorant and antimicrobial effect, the effect is relatively simple, and the prepared insole cannot simultaneously have the effect of air permeability, sweat-absorption, deodorization, odor-removal, mold resistance, antimicrobial, and cooling and itch-relieving.

Therefore, in view of the above problems, it is necessary to develop a mint polyurethane foam insole that excels at air permeability, sweat-absorption, deodorization and odor-removal and also has an cooling and itch-relieving effect.

SUMMARY

The following is a summary of subject matter that is described in detail herein. This summary is not intended to be a limitation to the scope of the claims.

An object of the present application is to provide a mint polyurethane foam insole with a cooling and itch-relieving effect, a preparation method therefor and an application thereof. By the harmonic combination of various components in raw materials, the obtained mint polyurethane foam insole has the long-lasting effect of air permeability, sweat-absorption, deodorization and odor-removal, mold resistance, antimicrobial, cooling and itch-relieving, as well as high wearing comfort at the same time.

To achieve the object, the present application adopts the following technical solutions.

In a first aspect, examples of the present application provide a mint polyurethane foam insole with a cooling and itch-relieving effect, and raw materials for preparing the mint polyurethane foam insole comprise the following components in parts by weight: 40-50 parts by weight of polymer polyol, 25-35 parts by weight of diisocyanate, 2-3 parts by weight of a foaming agent, 1-2 parts by weight of activated carbon, 4-6 parts by weight of a chain extender, 1-3 parts by weight of mint oil, and 5-7 parts by weight of mint oil.

Among the raw materials, the polymer polyol can be 41 parts by weight, 42 parts by weight, 43 parts by weight, 44 parts by weight, 45 parts by weight, 46 parts by weight, 47 parts by weight, 48 parts by weight, or 49 parts by weight, etc.

The diisocyanate can be 26 parts by weight, 27 parts by weight, 28 parts by weight, 29 parts by weight, 30 parts by weight, 31 parts by weight, 32 parts by weight, 33 parts by weight, or 34 parts by weight, etc.

The foaming agent can be 2.1 parts by weight, 2.2 parts by weight, 2.3 parts by weight, 2.4 parts by weight, 2.5 parts by weight, 2.6 parts by weight, 2.7 parts by weight, 2.8 parts by weight, or 2.9 parts by weight, etc.

The activated carbon can be 1.1 parts by weight, 1.2 parts by weight, 1.3 parts by weight, 1.4 parts by weight, 1.5 parts by weight, 1.6 parts by weight, 1.7 parts by weight, 1.8 parts by weight, or 1.9 parts by weight, etc.

The chain extender can be 4.2 parts by weight, 4.4 parts by weight, 4.6 parts by weight, 4.8 parts by weight, 5 parts by weight, 5.2 parts by weight, 5.4 parts by weight, 5.6 parts by weight, or 5.8 parts by weight, etc.

The mint oil can be 1.2 parts by weight, 1.4 parts by weight, 1.6 parts by weight, 1.8 parts by weight, 2 parts by weight, 2.2 parts by weight, 2.4 parts by weight, 2.6 parts by weight, or 2.8 parts by weight, etc.

The mint powder can be 5.2 parts by weight, 5.4 parts by weight, 5.6 parts by weight, 5.8 parts by weight, 6 parts by weight, 6.2 parts by weight, 6.4 parts by weight, 6.6 parts by weight, or 6.8 parts by weight, etc.

The raw materials for preparing the mint polyurethane foam insole with a cooling and itch-relieving effect provided by the examples of the present application comprise a combination of polymer polyol, diisocyanate, a foaming agent, activated carbon, a chain extender, mint oil, and mint powder; the mint oil, mint powder, and activated carbon added as raw materials by specific amounts create synergistic collaboration; in one aspect, the activated carbon can be used to adsorb the mint powder, thereby fixing the mint powder tightly in the insole to avoid the quick dissipation of the mint powder during the use process of the insole, and the mint powder contains a large amount of mint oil, and can gradually volatilize mint oil, and the combination of the volatilized mint oil and the mint oil added initially ensures that the insole has a long-lasting and effective performance of cooling and itch-relieving over the whole using process; in another aspect, the combination of activated carbon, mint oil, and mint powder has the effect of odor-absorption, moisture-absorption, odor-removal, mold resistance and antimicrobial efficiency as well, thereby enabling the obtained mint polyurethane foam insole to have excellent sweat-absorbent, deodorant, mold-resistant, and antimicrobial functions, and wearing comfort.

In one example, the polymer polyol comprises polyether polyol and/or polyester polyol.

In one example, the diisocyanate comprises diphenylmethane diisocyanate.

In one example, the foaming agent comprises water.

In one example, the chain extender comprises a combination of ethylene glycol and diethanolamine.

In one example, in the raw materials for preparing the mint polyurethane foam insole, a content of the ethylene glycol is 3-4 parts by weight, such as 3.1 parts by weight, 3.2 parts by weight, 3.3 parts by weight, 3.4 parts by weight, 3.5 parts by weight, 3.6 parts by weight, 3.7 parts by weight, 3.8 parts by weight, or 3.9 parts by weight, etc.

In one example, in the raw materials for preparing the mint polyurethane foam insole, a content of the diethanolamine is 1-2 parts by weight, such as 1.2 parts by weight, 1.3 parts by weight, 1.4 parts by weight, 1.5 parts by weight, 1.6 parts by weight, 1.7 parts by weight, 1.8 parts by weight, or 1.9 parts by weight, etc.

In one example, a mass ratio of the mint oil to the mint powder is 1:(2-4), such as 1:2.2, 1:2.4, 1:2.6, 1:2.8, 1:3, 1:3.2, 1:3.4, 1:3.6, or 1:3.8, etc.

As an optional technical solution for the examples of the present application, the mass ratio of the mint oil to the mint powder added in the raw materials is limited at 1:(2-4), so that the obtained mint polyurethane foam insole can provide the most excellent effect of cooling and itch-relieving, and the effect can be sustained over the longest period of time. In one aspect, if the additive amount of mint oil is too low, the cooling and itch-relieving effect of the insole in the early stage of use is not obvious; in another aspect, if the additive amount of mint powder is too low, the cooling and itch-relieving effect of the insole in the later stage of use is not obvious, and the serve sustainability is poor.

10 In one example, the raw materials for preparing the mint polyurethane foam insole further comprise an antimicrobial agent.

In one example, in the raw materials for preparing the mint polyurethane foam insole, a content of the antimicrobial agent is 0.5-1.5 parts by weight, such as 0.6 parts by weight, 0.7 parts by weight, 0.8 parts by weight, 0.9 parts by weight, 1 part by weight, 1.1 parts by weight, 1.2 parts by weight, 1.3 parts by weight, or 1.4 parts by weight, etc.

15 In one example, the raw materials for preparing the mint polyurethane foam insole further comprise any one or a combination of at least two of silicone oil, a colorant, or water.

20 In one example, in the raw materials for preparing the mint polyurethane foam insole, a content of the silicone oil is 1-3 parts by weight, such as 1.2 parts by weight, 1.4 parts by weight, 1.6 parts by weight, 1.8 parts by weight, 2 parts by weight, 2.2 parts by weight, 2.4 parts by weight, 2.6 parts by weight, or 2.8 parts by weight, etc.

In one example, in the raw materials for preparing the mint polyurethane foam insole, a content of the colorant is 1-2 parts by weight, such as 1.2 parts by weight, 1.3 parts by weight, 1.4 parts by weight, 1.5 parts by weight, 1.6 parts by weight, 1.7 parts by weight, 1.8 parts by weight, or 1.9 parts by weight, etc.

25 In one example, in the raw materials for preparing the mint polyurethane foam insole, a content of the water is 0.5-1.5 parts by weight, such as 0.6 parts by weight, 0.7 parts by weight, 0.8 parts by weight, 0.9 parts by weight, 1 part by weight, 1.1 parts by weight, 1.2 parts by weight, 1.3 parts by weight, or 1.4 parts by weight, etc.

In a second aspect, the present application provides a preparation method for the mint

polyurethane foam insole according to the first aspect, and the preparation method comprises: mixing polymer polyol, a foaming agent, activated carbon, a chain extender, mint oil, mint powder, optional silicone oil and an optional colorant with water, adding isocyanate and preforming reaction, performing foaming and molding to obtain the mint polyurethane foam insole.

In one example, the mixing is performed at a temperature of 70-90 °C, such as 72 °C, 74 °C, 76 °C, 78 °C, 80 °C, 82 °C, 84 °C, 86 °C, or 88 °C, etc.

In one example, the mixing is performed for a period of 1-30 min, such as 2 min, 4 min, 6 min, 8 min, 10 min, 12 min, 14 min, 16 min, 18 min, 20 min, 22 min, 24 min, 26 min, or 28 min, etc.

10 In one example, the reaction is performed for a period of 1-2 h, such as 1.1 h, 1.2 h, 1.3 h, 1.4 h, 1.5 h, 1.6 h, 1.7 h, 1.8 h, or 1.9 h.

In one example, the reaction is performed at a temperature of 90-110 °C, such as 92 °C, 94 °C, 96 °C, 98 °C, 100 °C, 102 °C, 104 °C, 106 °C, or 108 °C, etc.

15 In a third aspect, examples of the present application provide an application of the mint polyurethane foam insole according to the first aspect in footwear.

In one example, the footwear comprises an athletic shoe.

Compared with the related art, the present application has the following beneficial effects.

20 The raw materials for preparing the mint polyurethane foam insole with a cooling and itch-relieving effect provided by the present application comprise a combination of polymer polyol, diisocyanate, a foaming agent, activated carbon, a chain extender, mint oil, and mint powder; the mint oil, mint powder, and activated carbon added by specific amounts as a combination in the raw materials create synergistic collaboration, and thereby the obtained mint polyurethane foam insole can have a long-lasting and effective cooling and itch-relieving effect, as well as high air permeability and excellent color fastness to perspiration; specifically, for the
25 mint polyurethane foam insole provided by the present application, the air permeability is 122-135 mm/s, and the color fastness to perspiration is at grade 3-4, and the cooling and itch-relieving effect test shows that the insole has a cooling effect both at the beginning of use and after one month of use, and also has a high wearing comfort.

DETAILED DESCRIPTION

The technical solution of the present application is further explained by embodiments below. Those skilled in the field should understand that the examples are merely assist in understanding the present application and should not be regarded as a specific limitation to the present application.

Raw materials and sources thereof involved in embodiments, including information on manufacturers and product names, are shown in Table 1 below.

Table 1

	Manufacturer	Product name
Polyether polyol	Dow Chemical	VORANOL 2120
Polyester polyol	Polyether polyol	VORANOL 2100
Silicone oil	Dow Corning	PMX200-1000CST
Colorant	Aolai Xin Science and Technology Co., Ltd.	

10 Example 1

This example provides a mint polyurethane foam insole with a cooling and itch-relieving effect, which has raw materials comprising the following components in parts by weight:

	polyether polyol	27.5 parts by weight;
	polyester polyol	20 parts by weight;
15	diphenylmethane diisocyanate	30 parts by weight;
	a foaming agent	2.5 parts by weight;
	activated carbon	1.5 parts by weight;
	ethylene glycol	3.5 parts by weight;
	diethanolamine	1.5 parts by weight;

	mint oil	2 parts by weight;
	mint powder	6 parts by weight;
	silicone oil	2 parts by weight;
	a colorant	1.5 parts by weight; and
5	water	1 part by weight.

A preparation method for the mint polyurethane foam insole provided in this example comprises: polyether polyol, polyester polyol, the foaming agent, activated carbon, ethylene glycol, diethanolamine, mint oil, mint powder, silicone oil, and the colorant were mixed with water at 80 °C for 20 min, then added with diphenylmethane diisocyanate and reacted at 100 °C for 30 min, and subjected to foaming and molding in a mold to obtain the mint polyurethane foam insole.

Example 2

This example provides a mint polyurethane foam insole with a cooling and itch-relieving effect, which has raw materials comprising the following components in parts by weight:

15	polyether polyol	20 parts by weight;
	polyester polyol	20 parts by weight;
	diphenylmethane diisocyanate	25 parts by weight;
	a foaming agent	2 parts by weight;
	activated carbon	1 part by weight;
20	ethylene glycol	2.5 parts by weight;
	diethanolamine	1.5 parts by weight;
	mint oil	2 parts by weight;
	mint powder	5 parts by weight;

silicone oil	1 part by weight;
a colorant	1 part by weight; and
water	0.5 parts by weight.

5 A preparation method for the mint polyurethane foam insole provided in this example is the same as in Example 1.

Example 3

This example provides a mint polyurethane foam insole with a cooling and itch-relieving effect, which has raw materials comprising the following components in parts by weight:

	polyether polyol	30 parts by weight;
10	polyester polyol	20 parts by weight;
	diphenylmethane diisocyanate	35 parts by weight;
	a foaming agent	3 parts by weight;
	activated carbon	2 parts by weight;
	ethylene glycol	4 parts by weight;
15	diethanolamine	2 parts by weight;
	mint oil	3 parts by weight;
	mint powder	7 parts by weight;
	silicone oil	3 parts by weight;
	a colorant	2 parts by weight; and
20	water	15 parts by weight.

A preparation method for the mint polyurethane foam insole provided in this example is the same

as in Example 1.

Example 4

5 This example provides a mint polyurethane foam insole with a cooling and itch-relieving effect, and the only difference between this example and Example 1 is that the additive amount of the mint oil was 1 part by weight, and the additive amount of the mint powder was 7 parts by weight. The other components, usage amounts, and preparation method are the same as in Example 1.

Example 5

10 This example provides a mint polyurethane foam insole with a cooling and itch-relieving effect, and the only difference between this example and Example 1 is that the additive amount of the mint oil was 3 parts by weight, and the additive amount of the mint powder was 5 parts by weight. The other components, usage amounts, and preparation method are the same as in Example 1.

Comparative Example 1

15 This comparative example provides a polyurethane foam insole, and the only difference between this comparative example and Example 1 is that the activated carbon was not added. The other components, usage amounts, and preparation method are the same as in Example 1.

Comparative Example 2

20 This comparative example provides a polyurethane foam insole, and the only difference between this comparative example and Example 1 is that the mint powder was not added, and the additive amount of the mint oil was 8 parts by weight. The other components, usage amounts, and preparation method are the same as in Example 1.

Comparative Example 3

25 This comparative example provides a polyurethane foam insole, and the only difference between this comparative example and Example 1 is that the mint oil was not added, and the additive amount of the mint powder was 8 parts by weight. The other components, usage amounts, and preparation method are the same as in Example 1.

Comparative Example 4

This comparative example provides a polyurethane foam insole, and the only difference between this comparative example and Example 1 is that the mint oil and the mint powder were not added. The other components, usage amounts, and preparation method are the same as in Example 1.

5 Comparative Example 5

This comparative example provides a polyurethane foam insole, and the only difference between this comparative example and Example 1 is that the mint oil, mint powder and activated carbon were not added. The other components, usage amounts, and preparation method are the same as in Example 1.

10 Performance Test

(1) Air permeability: the test was performed according to the test method provided in “GB/T 5453-1997”.

(2) Color fastness to perspiration: the test was performed according to the test method provided in “GB/T 3922-2013”; the color-changing grade was assessed under acidic test conditions.

15 (3) Effect of cooling and itch-relieving: A total of 100 volunteers (each test group had 20 participants) were selected to use the polyurethane foam insoles provided by examples and comparative examples, and the user experience was recorded at the beginning of use and after 1 month of use.

20 According to the above test methods, the polyurethane foam insoles in Examples 1-5 and Comparative Examples 1-5 are tested, and the test results are shown in Table 2.

Table 2

	Air permeability (mm/s)	Color fastness to perspiration (grade)	Cooling and itch-relieving effect	
			first day	30th day
Example 1	133	4	Obvious cooling effect	Obvious cooling effect
Example 2	135	4	Obvious cooling effect	Obvious cooling effect
Example 3	134	4	Obvious cooling	Obvious cooling

			effect	effect
Example 4	122	3	Non-obvious cooling effect	Non-obvious cooling effect
Example 5	124	3	Obvious cooling effect	Non-obvious cooling effect
Comparative Example 1	100	2	Obvious cooling effect	No cooling effect
Comparative Example 2	121	3	Obvious cooling effect	No cooling effect
Comparative Example 3	124	2	Non-obvious cooling effect	Non-obvious cooling effect
Comparative Example 4	126	2	No cooling effect	No cooling effect
Comparative Example 5	89	1	No cooling effect	No cooling effect

According to the data of Table 2, it can be seen that:

the mint polyurethane foam insole provided in the present application has effective air permeability and color fastness to perspiration, as well as a long-lasting and effective cooling and itch-relieving effect; specifically, for the mint polyurethane foam insole obtained in Examples 1-5, the air permeability is 122-135 mm/s, and the color fastness to perspiration is at grade 3-4, and the cooling and itch-relieving effect test shows that the insole has a cooling effect both at the beginning of use and after one month of use.

By comparing Example 1 with Comparative Example 1, it can be seen that the polyurethane insole obtained without activated carbon has lower air permeability and color fastness to perspiration, and does not have the effect of cooling and itch-relieving at all after 1 month of use, indicating that the effect of cooling and itch-relieving of the polyurethane insole obtained by Comparative Example 1 is poor in sustainability.

Furthermore, by comparing Example 1 with Comparative Examples 2-3, it can be seen that the sustainability of the cooling and itch-relieving effect of the polyurethane insole obtained without mint powder (Comparative Example 2) is poor, and the cooling and itch-relieving effect of the polyurethane insole obtained without mint oil (Comparative Example 3) is poor even in the first place.

Furthermore, by comparing Example 1 with Comparative Examples 4-5, it can be seen that the

polyurethane insole obtained without the mint oil and mint powder (Comparative Example 4) has no effect of cooling and itch-relieving; the polyurethane insole obtained without the mint oil, mint powder, and activated carbon (Comparative Example 5) neither has a cooling and itch-relieving effect nor a good air permeability.

- 5 Finally, by comparing Example 1 with Examples 4-5, it can be seen that the proportions of the added mint oil and mint powder, which is not within the limited scope of the present application, will affect the cooling and itch-relieving effect and air permeability of the obtained polyurethane insole.

- 10 The applicant declares that a mint polyurethane foam insole with a cooling and itch-relieving effect, a preparation method therefor and an application thereof in the present application are illustrated by the above examples, but the present application is not limited to the above examples, that is, the present application does not necessarily rely on the above examples to be implemented. Those skilled in the art should understand that any improvement of the present application, the equivalent substitution of each raw material of products, the addition of auxiliary
15 ingredients, and the selection of specific methods in the present application shall fall within the protection scope and disclosure scope of the present application.

What is claimed is:

1. A mint polyurethane foam insole with a cooling and itch-relieving effect, which has raw materials comprising the following components in parts by weight: 40-50 parts by weight of polymer polyol, 25-35 parts by weight of diisocyanate, 2-3 parts by weight of a foaming agent,
5 1-2 parts by weight of activated carbon, 4-6 parts by weight of a chain extender, 1-3 parts by weight of mint oil, and 5-7 parts by weight of mint powder.
2. The mint polyurethane foam insole according to claim 1, wherein the polymer polyol comprises polyether polyol and/or polyester polyol.
3. The mint polyurethane foam insole according to claim 1 or 2, wherein the diisocyanate
10 comprises diphenylmethane diisocyanate.
4. The mint polyurethane foam insole according to any one of claims 1-3, wherein the foaming agent comprises water.
5. The mint polyurethane foam insole according to any one of claims 1-4, wherein the chain extender comprises a combination of ethylene glycol and diethanolamine.
- 15 6. The mint polyurethane foam insole according to claim 5, wherein in the raw materials for preparing the mint polyurethane foam insole, a content of the ethylene glycol is 3-4 parts by weight.
7. The mint polyurethane foam insole according to claim 5 or 6, wherein in the raw materials for preparing the mint polyurethane foam insole, a content of the diethanolamine is 1-2 parts by
20 weight.
8. The mint polyurethane foam insole according to any one of claims 1-7, wherein a mass ratio of the mint oil to the mint powder is 1:(2-4).
9. The mint polyurethane foam insole according to any one of claims 1-8, wherein the raw materials for preparing the mint polyurethane foam insole further comprise an antimicrobial
25 agent.
10. The mint polyurethane foam insole according to claim 9, wherein in the raw materials for preparing the mint polyurethane foam insole, a content of the antimicrobial agent is 0.5-1.5 parts

by weight.

11. The mint polyurethane foam insole according to any one of claims 1-10, wherein the raw materials for preparing the mint polyurethane foam insole further comprise any one or a combination of at least two of silicone oil, a colorant or water.

5 12. The mint polyurethane foam insole according to claim 11, wherein in the raw materials for preparing the mint polyurethane foam insole, a content of the silicone oil is 1-3 parts by weight.

13. The mint polyurethane foam insole according to claim 11 or 12, wherein in the raw materials for preparing the mint polyurethane foam insole, a content of the colorant is 1-2 parts by weight.

10 14. The mint polyurethane foam insole according to claim 11, 12 or 13, wherein in the raw materials for preparing the mint polyurethane foam insole, a content of the water is 0.5-1.5 parts by weight.

15 15. A preparation method for the mint polyurethane foam insole according to any one of claims 1-14, comprising: mixing polymer polyol, a foaming agent, activated carbon, a chain extender, mint oil, mint powder, optional silicone oil, and an optional colorant with water, adding isocyanate and preforming reaction, and performing foaming and molding to obtain the mint polyurethane foam insole.

16. The preparation method according to claim 15, wherein the mixing is performed at a temperature of 70-90 °C.

20 17. The preparation method according to claim 15 or 16, wherein the mixing is performed for a period of 1-30 min.

18. The preparation method according to claim 15, 16 or 17, wherein the reaction is performed for a period of 1-2 h;

optionally, the reaction is performed at a temperature of 90-110 °C.

25 19. An application of the mint polyurethane foam insole according to any one of claims 1-18 in footwear;

optionally, the footwear comprises an athletic shoe.