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(54) **COOLING FILTER AND SMOKING ARTICLE COMPRISING SAME**

(57) The disclosure relates to a cooling filter and a smoking article including the same, and more particularly, to a cooling filter having a tubular shape with a hollow formed inside, and a main body portion, in which a coating layer is formed on a surface of the hollow, and the coating layer includes alkaline metal chloride, and a smoking article including the same. By using the filter, a smoking article with an effective cooling function and improved tobacco taste and long-lasting smoke flavor may be provided.

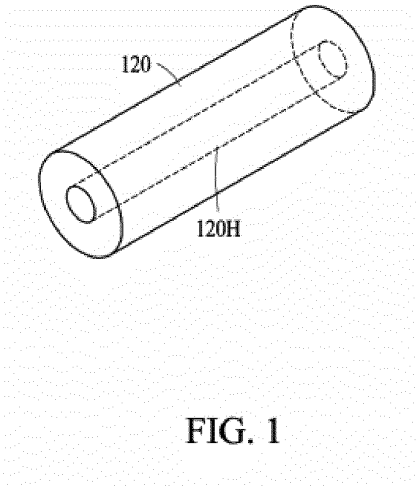

FIG. 1

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Description

Technical Field

[0001] The present disclosure relates to a cooling filter and a smoking article including the same.

Background Art

[0002] A heating type stick article is needed to be heated using a dedicated device to express a smoke flavor of a medium portion (including a smoke flavor and aerosol generating articles containing tobacco raw materials such as cuts and the like and fragrance). In the dedicated device for the heating type stick that has been developed so far to express the smoke flavor, a temperature program is designed to perform high-temperature heating considering thermal transfer to the inside of the medium portion. A heating temperature is usually approximately between 200°C and 400°C and a large amount of water vapor is generated when the stick of the medium portion is heated through the device, unlike traditional cigarettes which burn the cuts for the inhalation. A temperature inside the medium portion expressed through the heating is approximately between 100°C to 200°C. A temperature of an airflow generated inside the medium portion is also similar, and a smoker may inhale the hot heat, if there is no cooling material downstream of the medium portion.

[0003] Accordingly, there is research being actively conducted to develop a cooling material capable of improving economy and function of a new heating type stick.

Prior Art Document

Patent Document

[0004] (Patent Document 1) Korean Laid-open Patent Publication No. 2021-0104501

Disclosure of the Invention

Technical Goals

[0005] In order to solve the aforementioned problems, the present disclosure provides a cooling filter that has an excellent cooling effect due to phase transition and is easily decomposed at the time of disposal.

[0006] The present disclosure provides a smoking article including the cooling filter according to the present disclosure.

[0007] However, aspects to be achieved in the present disclosure are not limited to the above-described aspects, and other aspects not mentioned herein may be clearly understood by a person having ordinary skill in the art to which the present disclosure pertains from the following description.

Technical Solutions

[0008] According to an embodiment of the present disclosure, there is provided a cooling filter including a coating layer, in which the coating layer contains alkaline metal chloride.

[0009] According to an embodiment of the present disclosure, the coating layer may have a basis weight of 1% to 30% of a basis weight of the filter and contain alkaline metal chloride.

[0010] According to an embodiment of the present disclosure, the alkaline metal chloride may be one or more kinds selected from a group consisting of sodium chloride, potassium chloride, and lithium chloride.

[0011] According to an embodiment of the present disclosure, the coating layer may further include one or more kinds selected from a group consisting of cellulose, a cellulose derivative, an alcohol resin, and sugars.

[0012] According to an embodiment of the present disclosure, the cellulose derivative may be one or more kinds selected from a group consisting of methyl cellulose, ethyl cellulose, carboxymethyl cellulose, carboxyethyl cellulose, hydroxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropylmethyl cellulose, hydroxyethyl-methyl cellulose, and agar.

[0013] According to an embodiment of the present disclosure, the alcohol resin may be polyvinyl alcohol.

[0014] According to an embodiment of the present disclosure, the sugars may be one or more kinds selected from a group consisting of sugar alcohol, monosaccharide, disaccharide, oligosaccharide, and polysaccharide.

[0015] According to an embodiment of the present disclosure, the cellulose, cellulose derivative, alcohol resin, or sugars may be coated with a basis weight of 0.1% to 15% of a basis weight of the filter.

[0016] According to an embodiment of the present disclosure, the filter may have a tubular shape with a hollow formed inside and the coating layer may be formed on a surface of the hollow.

[0017] According to an embodiment of the present disclosure, the filter may include one or more materials selected from a group consisting of paper, a polymer, and cellulose acetate.

[0018] According to an embodiment of the present disclosure, the cooling filter may have a length of 5 millimeters (mm) or more and a circumference of 14 to 27 mm.

[0019] According to an embodiment of the present disclosure, the cooling filter may have draw resistance of 0.1 to 3.5 mmH2O per millimeter.

[0020] According to an embodiment of the present disclosure, there is provided a smoking article including a smoking material portion; a cooling portion including a cooling filter according to the present disclosure positioned downstream of the smoking material portion; and a mouthpiece portion positioned downstream of the cooling portion.

[0021] According to an embodiment of the present disclosure, the smoking article is heating type tobacco and may be in the form of a cigarette.

Effects

[0022] According to the present disclosure, the cooling filter coated with a material having endothermic and hygroscopic properties is inserted to a downstream portion of the smoking material portion of the smoking article, thereby providing a smoking article having an effective cooling function and improved tobacco taste and long-lasting smoke flavor.

Brief Description of Drawings

[0023]

FIG. 1 illustrates an example of a cooling filter according to the present disclosure, according to an embodiment of the present disclosure.

FIG. 2 illustrates an example of a smoking article to which the cooling filter according to the present disclosure is applied, according to another embodiment of the present disclosure.

FIG. 3 illustrates a result of confirming a cooling effect of cooling filters according to examples and comparative example of the present disclosure.

Best Mode for Carrying Out the Invention

[0024] Hereinafter, embodiments of the present disclosure will be described in detail with reference to the accompanying drawings. When it is determined detailed description related to a related known function or configuration they may make the purpose of the present disclosure unnecessarily ambiguous in describing the present disclosure, the detailed description will be omitted here. In addition, terminologies used herein are defined to appropriately describe the embodiments and thus may be changed depending on a user, the intent of an operator, or a custom of a field to which the present disclosure pertains. Accordingly, the terminologies must be defined based on the following overall description of the present specification. In the drawings, like reference numerals are used for like elements.

[0025] In the whole specification, when a member is positioned "on" another member, this not only includes a case that the any member is brought into contact with the other member, but also includes a case that another member exists between two members.

[0026] It will be understood that when a certain part "includes" a certain component, the part does not exclude another component but may further include another component.

[0027] Throughout the specification, when a user inhales the external air by using a smoking article, a portion where the air flows to the inside from the outside of the smoking article is referred to as an "upstream" portion and a portion where the air flows out to the outside from the inside of the smoking article including a combustible heat source is referred to as a "downstream" portion. The terms "upstream" and "downstream" may be used to indicate a relative position or orientation between portions or segments constituting the smoking article.

[0028] Hereinafter, a cooling filter and a smoking article including the cooling filter according to the present disclosure will be described in detail with reference to embodiments and drawings. However, the present disclosure is not limited to the embodiments and drawings.

[0029] In the present disclosure, in a cooling filter 120, the filter may include a coating layer and the coating layer contains an alkaline metal chloride.

[0030] As shown in FIG. 1, the cooling filter 120 of the present disclosure may have a tubular shape with a hollow 120H formed inside. The coating layer is formed on a surface of the hollow inside thereof, that is, a flow path through which gas introduced from an upstream side passes.

[0031] According to an embodiment of the present disclosure, the coating layer has a basis weight of 1% to 30% of a basis weight of the filter and contains alkaline metal chloride. As the surface of the hollow inside the filter is coated

with the alkaline metal chloride, the alkaline metal chloride may dissolve by moisture generated at the time of heating the smoking article and cause an endothermic reaction which may provide an airflow cooling effect. In addition, since the alkaline metal chloride is a material that may be easily decomposed into soil, the cooling filter may be used as an environment-friendly product.

[0032] According to an embodiment of the present disclosure, the alkaline metal chloride may be one or more kinds selected from a group consisting of sodium chloride, potassium chloride, and lithium chloride. As the alkaline metal chloride, sodium chloride is desirably used. The sodium chloride has a property advantageous to lower a temperature of a mainstream smoke due to occurrence of an endothermic reaction due to moisture absorption, as the sodium chloride may absorb moisture contained in the airflow at the time of smoking.

[0033] According to an embodiment of the present disclosure, the coating layer may further include one or more kinds selected from a group consisting of cellulose, a cellulose derivative, an alcohol resin, and sugars, the cellulose derivative may be one or more kinds selected from a group consisting of methyl cellulose, ethyl cellulose, carboxymethyl cellulose, carboxyethyl cellulose, hydroxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropylmethyl cellulose, hydroxyethylmethyl cellulose, and agar, and the alcohol resin may be polyvinyl alcohol, but these are not limited thereto. The sugars may be one or more kinds selected from a group consisting of sugar alcohol, monosaccharide, disaccharide, oligosaccharide, and polysaccharide but are not limited thereto. The sugar alcohol may be sorbitol, xylitol, mannitol, maltitol, or lactitol, the monosaccharide may be fructose, glucose, or galactose, the disaccharide may be sucrose, lactose, or maltose, and the polysaccharide may be starch, dietary fibers, or glycogen.

[0034] In the cellulose, cellulose derivative, alcohol resin, or sugars, the phase transition occurs at a temperature level of the airflow generated at the time of smoking, which enables the endothermic reaction. Accordingly, when the materials described above are used in addition to alkaline metal chloride, the cooling effect may be further improved.

[0035] According to an embodiment of the present disclosure, the cellulose, cellulose derivative, alcohol resin, or sugars may be coated with a basis weight of 1% to 15% of a basis weight of the filter and desirably coated with a basis weight of 0.5% to 1.5%. When the basis weight is included in the above range, the cooling effect may be further improved.

[0036] The cooling filter 120 may be made of a material such as paper, polymer, or cellulose acetate. The material may be desirably paper but is not limited thereto. The cooling filter may be changed in shape, thickness, length, and the like depending on the applied smoking article, and may desirably have a length of 5 mm or more and a circumference of 14 to 27 mm. When the above length and circumference are obtained, there is no effect on a smoke flavor of the smoking while effectively lowering a temperature of gas generated due to the heating of a smoking material.

[0037] According to an embodiment of the present disclosure, the material of the cooling filter may be paper and may include, specifically, a paper tube. The paper used for the paper tube may have a basis weight of 10 to 500 g/m^2, but is not limited thereto. The paper may more desirably have a basis weight of 30 to 300 g/m^2.

[0038] According to an embodiment of the present disclosure, the cooling filter may have draw resistance of 0.1 to 3.5 mm H_2O per millimeter. As the draw resistance in the above range is obtained, the smoking article of the present disclosure has an excellent effect in sucking property.

[0039] The present disclosure relates to a smoking article including the cooling filter according to the present disclosure. As used herein, the "smoking article" refers to a cigarette, a tobacco derivative, expanded tobacco, reconstituted tobacco, any product that may be used for smoking regardless whether it is based on a tobacco substitute, or any product capable of providing a smoking experience. Particularly, in the present disclosure, the smoking article may refer to a smokable product capable of generating an aerosol such as a heating type electronic cigarette.

[0040] According to an embodiment of the present disclosure, the smoking article 100 may include a smoking material portion 110; a cooling portion including the cooling filter 120 according to the present disclosure positioned downstream of the smoking material portion; and a mouthpiece portion 130 positioned downstream of the cooling portion.

[0041] The smoking material portion 110; the cooling portion including the cooling hollow filter 120; and the mouthpiece portion 130 may be connected in a longitudinal direction. That is, the mouthpiece portion 130 may be positioned at a most downstream side of the smoking material portion 110, that is, in a direction closest to a smoker, and the smoking material portion may be positioned on a most upstream side, that is, a direction (an upstream direction) farthest from the smoker.

[0042] Referring to FIG. 2, the smoking article is a smoking article including a hollow filter in the cooling portion. The configuration of the cooling portion including only the hollow filter according to the present disclosure as described above is merely an example, and the cooling portion may further include other cooling elements other than the hollow filter.

[0043] According to an embodiment of the present disclosure, the smoking article includes an aerosol generating material. The aerosol generating material refers to a material capable of generating an aerosol and may be in a solid or liquid state.

[0044] For example, a solid aerosol generating material may include a solid substance based on tobacco raw materials such as plate-shaped leaf tobacco, cut tobacco, or reconstituted tobacco, and a liquid aerosol generating substrate may include a liquid composition based on nicotine, tobacco extracts, and/or various flavoring agents. However, the scope of the present disclosure is not limited to the examples listed above.

[0045] The liquid aerosol generating material may include, as more specific examples, at least one of propylene glycol (PG) or glycerin (GLY) and may further include at least one of ethylene glycol, dipropylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, or oleyl alcohol. In another example, the aerosol generating material may further include at least one of nicotine, moisture, or a flavoring material. In still another example, the aerosol generating material may further include various additives such as cinnamon, capsaicin, or the like. The aerosol generating material may contain, not only a liquid material having a high fluidity, but a material in the form of gel or solid. As described above, composition components of the aerosol generating material may be variously selected according to the embodiments and a composition ratio thereof may also vary according to the embodiments. Hereinafter, the liquid may refer to a liquid aerosol generating material.

[0046] According to an embodiment of the present disclosure, the smoking material portion may include the solid aerosol generating material or may include both the solid aerosol generating material and the liquid aerosol generating material. A length of the smoking material portion may be approximately 15 mm to 75 mm.

[0047] The smoking material portion may have a structure wrapped by a thermally conductive wrapper. The thermally conductive wrapper transfers heat generated from a combustible heat source to the tobacco material. The wrapper may be a metal foil wrapper such as an aluminum foil wrapper, a steel wrapper, an iron foil wrapper, and a copper foil wrapper; and a metal alloy foil wrapper, and the material thereof is not limited to the above materials, as long as it is a material capable of efficiently transferring heat.

[0048] The smoking material portion and the cooling portion may be wrapped by external cigarette paper. For example, it may be formed of paper or cellulose wrapping paper. However, the present disclosure is not limited thereto.

[0049] According to an embodiment of the present disclosure, the smoking article includes a mouthpiece portion. For example, the mouthpiece portion may be a mono filter, double filter, or triple filter. In addition, the mouthpiece portion may include at least one of filters having a porous matrix structure, tube structure, and paper tube structure. The filter may include a fibrous or filamentous filter tow containing at least one of a polymer, paper, cellulose acetate, activated carbon, and carbon, or a filter tow containing both. However, the embodiment is not limited thereto. In some embodiments, the material of the filter may further include at least one filter material widely known in the technical field, such as a carbon-containing adsorbent or activated carbon. Also, the mouthpiece portion may further include tip paper and/or filter wrapping paper for wrapping the filter and the tip paper and the filter wrapping paper may be, for example, a paper material, but are not limited thereto.

[0050] Hereinafter, embodiments will be described in detail with reference to the accompanying drawings. However, various alterations and modifications may be made to the embodiments. Here, the embodiments are not construed as limited to the disclosure. The embodiments should be understood to include all changes, equivalents, and replacements within the idea and the technical scope of the disclosure.

[0051] Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which embodiments belong. It will be further understood that terms, such as those defined in commonly-used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[Examples]

Example 1

[0052] A heating type cigarette having a structure of a smoking material portion, a hollow filter, and a mouthpiece portion, as the smoking article 100 shown in FIG. 2, prepared for a test for the examples was used, and a paper tube filter having an inner portion coated with 1% of polyvinyl alcohol was used as the hollow filter. As for the mouthpiece, a transfer jet nozzle system (TINS) filter flavored with approximately 6 mg of menthol was used.

Example 2

[0053] A heating type cigarette which is the same as that of Example 1 was prepared, except that a paper tube filter having an inner portion coated with 1% of carboxymethyl cellulose was used as the hollow filter.

Example 3

[0054] A heating type cigarette which is the same as that of Example 1 was prepared, except that a paper tube filter having an inner portion coated with 9% of sodium chloride was used as the hollow filter.

Example 4

[0055] A heating type cigarette which is the same as that of Example 1 was prepared, except that a paper tube filter having an inner portion coated with 1% of sodium chloride was used as the hollow filter.

Example 5

[0056] A heating type cigarette which is the same as that of Example 1 was prepared, except that a paper tube filter having an inner portion coated with 6% of sodium chloride was used as the hollow filter.

Example 6

[0057] A heating type cigarette which is the same as that of Example 1 was prepared, except that a paper tube filter having an inner portion coated with 15% of sodium chloride was used as the hollow filter.

Comparative Example 1

[0058] A heating type cigarette which is the same as that of Example 1 was prepared, except that a paper tube filter having an uncoated inner portion was used as the hollow filter.

<Confirmation of Cooling Effect>

[0059] In order to confirm the cooling effect of the heating type cigarettes prepared in the examples and comparative example described above, a maximum temperature of a mainstream smoke during puffing was measured and shown in Table 1 and FIG. 3 below.

[Table 1]

Maximum temperature level per puff (°C)	Number of puffs											
	1	2	3	4	5	6	7	8	9	10	11	12
Comparativ e Example 1	76.5	65.6	58.8	55.6	52.3	49.3	46	41.9	39.4	36.6	34.2	32.9
Example 1	65.4	57.2	50.8	48.4	46.7	44.4	42.4	40.9	39.4	38.6	38.1	37.6
Example 2	64.5	56.2	50.9	47.8	45.2	43.1	40.6	38.6	37.9	37.5	36.7	36.4
Example 3	65	55.6	49.7	45.3	43.7	41.8	39.7	37.8	36.8	36	35.2	34.7
Example 4	73.1	65.9	55.7	51.6	48.4	44.7	42	39.9	38.1	36.4	35	33.6
Example 5	70.2	61.7	55.3	51.8	48.6	44.7	41.2	38	35.2	33.6	32.8	32.4
Example 6	61	53.5	47.9	45.3	43.7	41.8	39.7	37.8	36.8	36	35.2	34.7

[0060] As a result, in Examples 1 to 6 in which the coated paper tubes were used, a significant effect of lowering an initial temperature was observed. Particularly, in Examples 3 to 6 in which the sodium chloride coating was used, a particularly excellent effect of lowering the temperature was observed.

<Observation of Sensory Characteristics>

[0061] In order to confirm Comparative Example 1 and the sensory characteristics according to a concentration of sodium chloride that is perceived to have an excellent cooling effect, the sensory evaluation was performed regarding thermal sensation during initial puffs, amount of aerosol, amount of atomization, and sucking property according to Comparative Example 1 and Examples 3 to 6 and results thereof were shown in Table 2. The sensory evaluation was performed on an evaluation panel of 25 members using respective cigarettes of Examples 2 weeks after manufacture, based on a total score of 5 points.

[Table 2]

Evaluation sample	Hotness during initial puffs (1 to 3 puffs)	Amount of atomization	Sucking property
Comparative Example 1	5.0	5.0	4.9
Example 3 (sodium chloride 9%)	3.0	5.0	4.8
Example 4 (sodium chloride 1%)	4.7	5.0	5.0
Example 5 (sodium chloride 6%)	4.8	4.9	5.0
Example 6 (sodium chloride 15%)	2.7	4.8	5.0

[0062] From the results described above, it was found that the examples showed the amount of atomization and sucking property that are not different from or at a similar level as those of the uncoated paper tube, and as the content of sodium chloride increases, the hotness during the initial puffs significantly decreases.

[0063] A number of embodiments have been described above. Nevertheless, it should be understood that various modifications may be made to these embodiments. For example, suitable results may be achieved if the described techniques are performed in a different order and/or if components in a described system, architecture, device, or circuit are combined in a different manner and/or replaced or supplemented by other components or their equivalents. Therefore, other implementations, other embodiments, and equivalents to the claims are also within the scope of the following claims.

Explanation of Reference numerals

[0064]

100: Smoking article
110: Smoking material portion
120: Cooling filter
120H: Hollow
130: Mouthpiece portion

Claims

1. A cooling filter comprising:

a coating layer,
wherein the coating layer comprises alkaline metal chloride.

2. The cooling filter of claim 1, wherein the coating layer has a basis weight of 1% to 30% of a basis weight of the filter and contains alkaline metal chloride.

3. The cooling filter of claim 1, wherein the alkaline metal chloride is one or more kinds selected from a group consisting of sodium chloride, potassium chloride, and lithium chloride.

4. The cooling filter of claim 1, wherein the filter has a tubular shape with a hollow formed inside and the coating layer is formed on a surface of the hollow.

5. The cooling filter of claim 1, wherein the coating layer further comprises one or more kinds selected from a group consisting of cellulose, a cellulose derivative, an alcohol resin, and sugars.

6. The cooling filter of claim 5, wherein the cellulose derivative is one or more kinds selected from a group consisting

of methyl cellulose, ethyl cellulose, carboxymethyl cellulose, carboxyethyl cellulose, hydroxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropylmethyl cellulose, hydroxyethylmethyl cellulose, and agar.

7. The cooling filter of claim 5, wherein the alcohol resin is polyvinyl alcohol.

8. The cooling filter of claim 5, wherein the cellulose, cellulose derivative, alcohol resin, or sugars is coated in a content of 0.1% to 15% of a basis weight of the filter.

9. The cooling filter of claim 1, wherein the filter comprises one or more materials selected from a group consisting of paper, a polymer, and cellulose acetate.

10. The cooling filter of claim 1, wherein the cooling filter has a length of 5 millimeters (mm) or more and a circumference of 14 to 27 mm.

11. The cooling filter of claim 1, wherein the cooling filter has draw resistance of 0.1 to 3.5 mm H_2O per millimeter.

12. A smoking article comprising:

a smoking material portion;
a cooling portion comprising the cooling filter of claim 1 positioned downstream of the smoking material portion; and
a mouthpiece portion positioned downstream of the cooling portion.

13. The smoking article of claim 12, wherein the smoking article is heating type tobacco and is in the form of a cigarette.

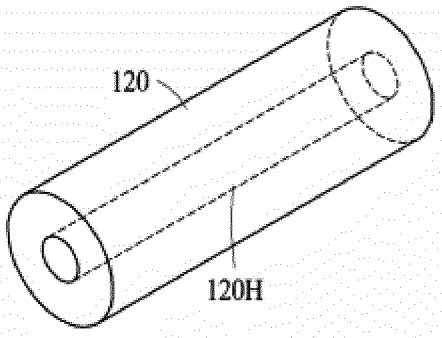


FIG. 1

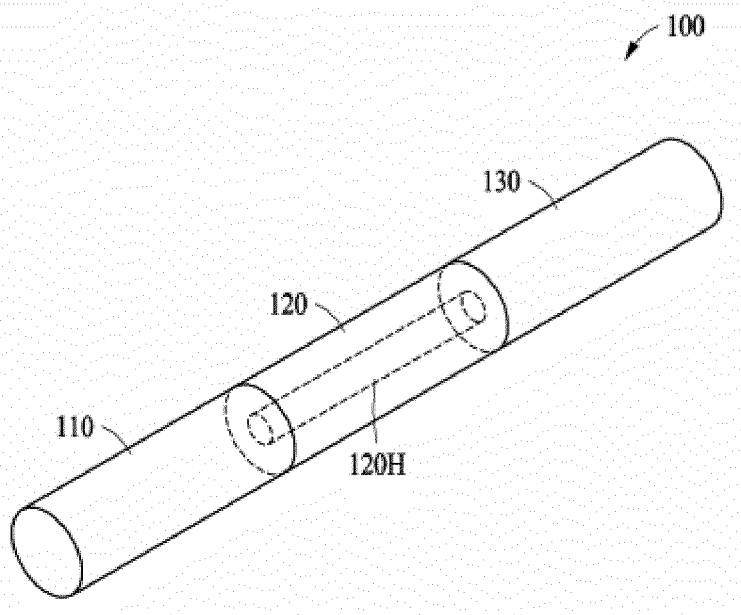
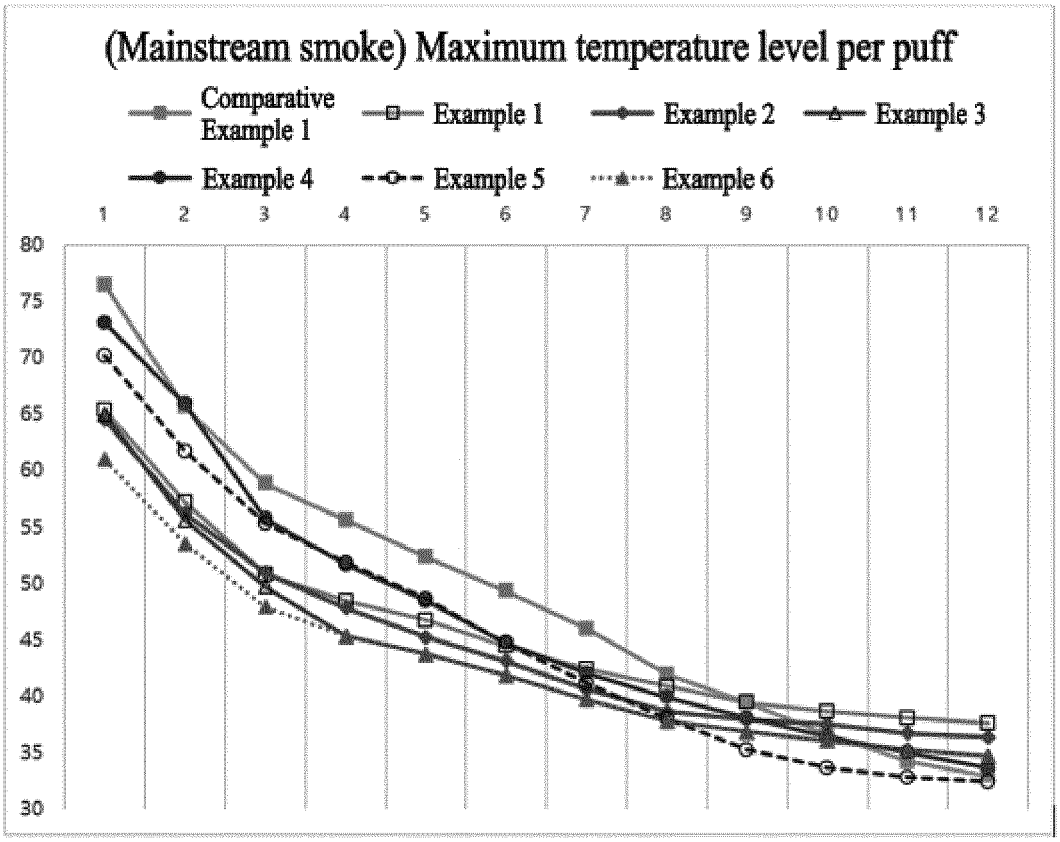


FIG. 2


(Mainstream smoke) Maximum temperature level per puff
Comparative Example 1
Example 1
Example 2
Example 3
Example 4
Example 5
Example 6
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6
7
8
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FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2022/019987

A. CLASSIFICATION OF SUBJECT MATTER

A24D 3/04(2006.01)i; **A24D 3/02**(2006.01)i; **A24D 3/06**(2006.01)i; **A24D 3/10**(2006.01)i; **A24D 3/08**(2006.01)i; **A24D 1/04**(2006.01)i; **A24D 1/20**(2020.01)i; **A24D 3/16**(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24D 3/04(2006.01); A24B 15/16(2006.01); A24D 1/04(2006.01); A24D 3/17(2020.01); A24F 13/04(2006.01); A24F 40/40(2020.01); A24F 47/00(2006.01)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS (KIPO internal) & keywords: 흡연 물품(smoking article), 냉각용 필터(cooling filter), 코팅층(coating layer), 알칼리금속 염화물(alkali metal chloride), 흡열 반응(endothermic reaction)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 10-2021-0043675 A (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 21 April 2021 (2021-04-21) See paragraphs [0008], [0014], [0022], [0028]-[0031] and [0041]-[0043]; claim 1; and figures 1, 2, 4 and 10.	1-13
Y	KR 10-2020-0083440 A (YUNNAN XIKE SCIENCE & TECHNOLOGY CO., LTD.) 08 July 2020 (2020-07-08) See paragraphs [0051]-[0057]; and figures 1-4.	1-13
A	KR 10-2020-0044933 A (DEUTSCHE BENKERT GMBH) 29 April 2020 (2020-04-29) See entire document.	1-13
A	KR 10-2020-0134331 A (YUN NAN TOBACCO BIOLOGICAL TECHNOLOGY CO., LTD.) 01 December 2020 (2020-12-01) See entire document.	1-13

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"D" document cited by the applicant in the international application
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
16 March 2023	**17 March 2023**
Name and mailing address of the ISA/KR **Korean Intellectual Property Office** **Government Complex-Daejeon Building 4, 189 Cheongsa-ro, Seo-gu, Daejeon 35208** Facsimile No. **+82-42-481-8578**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2022/019987

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 108143004 A (CHINA TOBACCO ANHUI INDUSTRIAL CO., LTD.) 12 June 2018 (2018-06-12) See entire document.	1-13

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/KR2022/019987

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
KR 10-2021-0043675 A	21 April 2021	CN 109288123 A	01 February 2019
		CN 109288123 B	20 August 2021
		EP 3815552 A1	05 May 2021
		JP 2021-533819 A	09 December 2021
		JP 7159474 B2	24 October 2022
		US 2021-0315268 A1	14 October 2021
		WO 2020-037811 A1	27 February 2020
KR 10-2020-0083440 A	08 July 2020	AU 2019-236899 A1	15 April 2021
		AU 2019-236899 A1	26 September 2019
		CN 108783588 A	13 November 2018
		CN 108783588 B	16 June 2020
		CN 109123780 A	04 January 2019
		CN 109363230 A	22 February 2019
		CN 109393550 A	01 March 2019
		CN 110839953 A	28 February 2020
		EP 3673755 A1	01 July 2020
		JP 2021-503295 A	12 February 2021
		JP 6966652 B2	17 November 2021
		KR 10-2430596 B1	09 August 2022
		PH 12021550570 A1	06 December 2021
		RU 2020129688 A	09 March 2022
		RU 2020129688 A3	09 March 2022
		US 2020-0229487 A1	23 July 2020
		WO 2019-179532 A1	26 September 2019
KR 10-2020-0044933 A	29 April 2020	CN 111601519 A	28 August 2020
		DE 102017120202 A1	07 March 2019
		DE 102017120202 B4	11 August 2022
		EP 3675659 A1	08 July 2020
		JP 2020-531052 A	05 November 2020
		US 2020-0329757 A1	22 October 2020
		WO 2019-042762 A1	07 March 2019
KR 10-2020-0134331 A	01 December 2020	CN 108523216 A	14 September 2018
		CN 108523216 B	25 August 2020
		GB 2587508 A	31 March 2021
		GB 2587508 B	29 September 2021
		JP 2021-511821 A	13 May 2021
		JP 6932859 B2	08 September 2021
		KR 10-2251658 B1	13 May 2021
		RU 2761996 C1	14 December 2021
		WO 2019-201290 A1	24 October 2019
CN 108143004 A	12 June 2018	CN 108143004 B	14 September 2021

Form PCT/ISA/210 (patent family annex) (July 2022)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- KR 20210104501 **[0004]**