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(54) **AEROSOL-GENERATING ARTICLE WITH TAGGANT**

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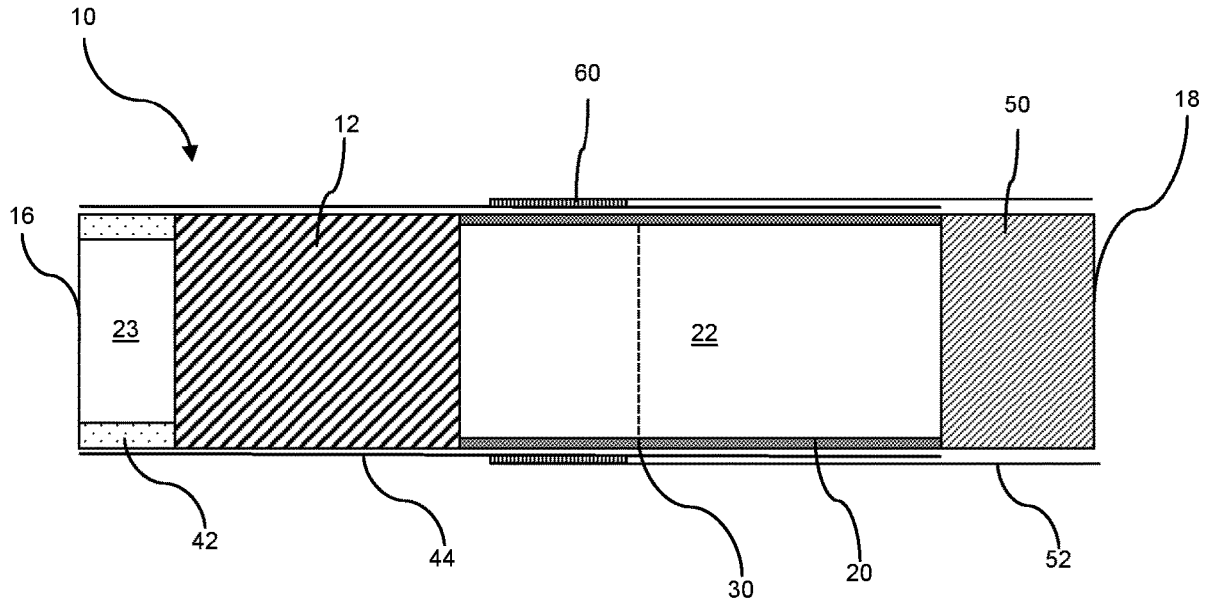
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(57) **ABSTRACT**

An aerosol-generating article is provided, including: an aerosol-generating substrate; a downstream section disposed downstream of the aerosol-generating substrate; and a taggant disposed on the downstream section, an upstream end of the taggant being at least 0.5 millimetre from a downstream end of the aerosol-generating substrate, the taggant being a chemical or physical marker added to a component, a presence of which may be detected by a suitable detector configured to enable the component to be identified, the downstream section further including a wrapper, the taggant being disposed on the wrapper, and the upstream end of the taggant being aligned with an upstream end of the wrapper. An aerosol-generating system including the aerosol-generating article and an aerosol-generating device is also provided.



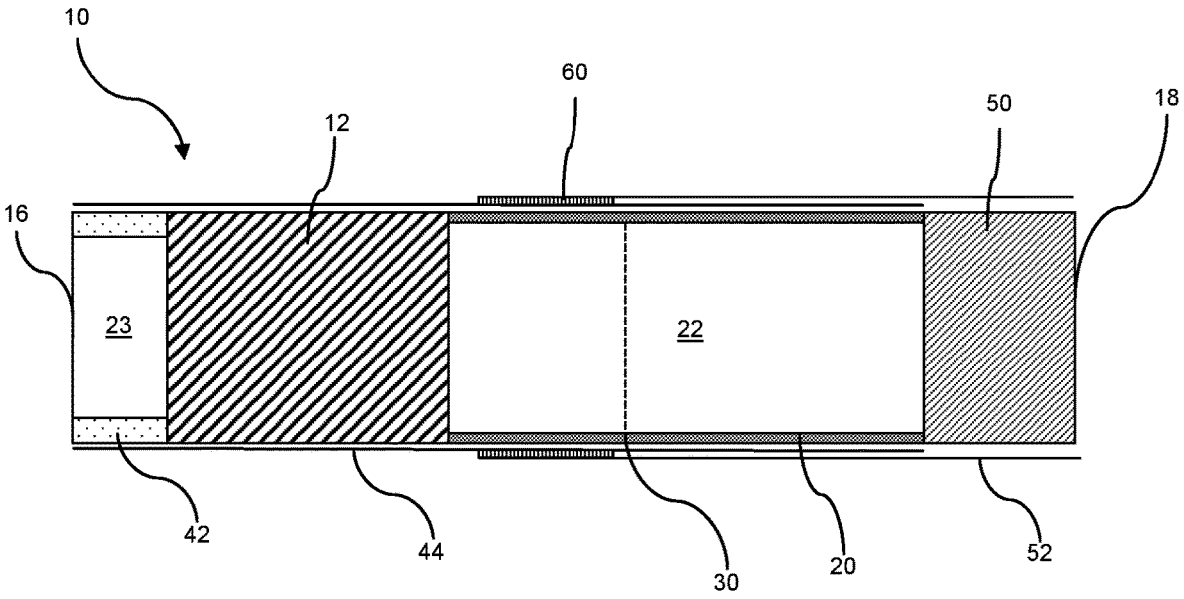



Figure 1

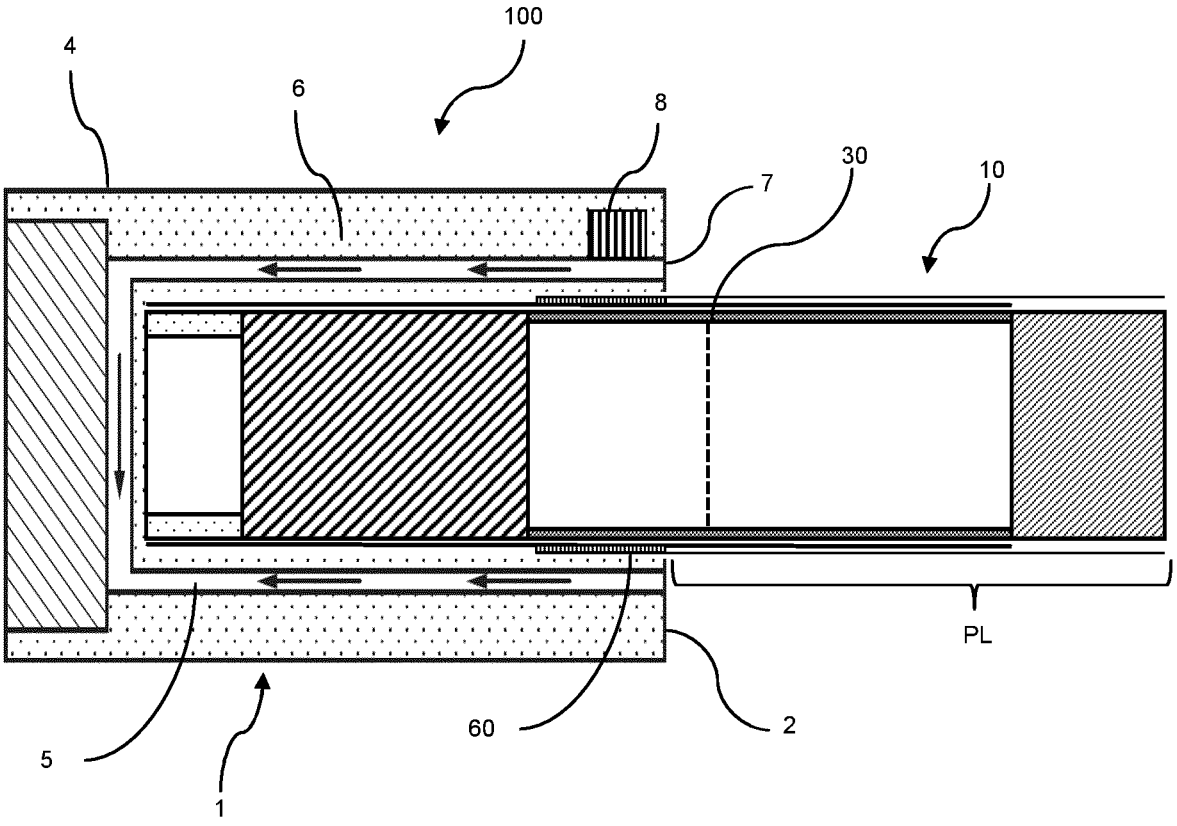



Figure 2

# AEROSOL-GENERATING ARTICLE WITH TAGGANT

**[0001]** The present invention relates to an aerosol-generating article comprising an aerosol-generating substrate. In particular, the present invention relates to an aerosol-generating article comprising an aerosol-generating substrate, the aerosol-generating article also including a taggant. The present invention also relates to an aerosol-generating system comprising such an aerosol-generating article and an aerosol-generating device.

**[0002]** Aerosol-generating articles in which an aerosol-generating substrate, such as a tobacco-containing substrate, is heated rather than combusted, are known in the art. Typically, in such heated smoking articles an aerosol is generated by the transfer of heat from a heat source to a physically separate aerosol-generating substrate or material, which may be located in contact with, within, around, or downstream of the heat source. During use of the aerosol-generating article, volatile compounds are released from the aerosol-generating substrate by heat transfer from the heat source and are entrained in air drawn through the aerosol-generating article. As the released compounds cool, they condense to form an aerosol.

**[0003]** A number of prior art documents disclose aerosol-generating devices for consuming aerosol-generating articles. Such devices include, for example, electrically heated aerosol-generating devices in which an aerosol is generated by the transfer of heat from one or more electrical heater elements of the aerosol-generating device to the aerosol-generating substrate of a heated aerosol-generating article. Aerosol-generating devices of the prior art may include a cavity for at least partially receiving an aerosol-generating article.

**[0004]** Specific aerosol-generating devices may be configured for use with specific aerosol-generating articles. For example, the temperature reached by the one or more electrical heater elements of an aerosol-generating device may be configured to maximise aerosol generation in specific aerosol-generating substrates without leading the generation of unpleasant flavours.

**[0005]** However, it is conceivable that a user may, inadvertently or otherwise, attempt to use an aerosol-generating article with an aerosol-generating device where the device is not designed to be used with the article. For example, a user may attempt to use a conventional combustible cigarette, or a counterfeit aerosol-generating article in an aerosol-generating device. This may result in poor aerosol-generation and reduced user experience which may reflect badly on the aerosol-generating device. In addition, the use of aerosol-generating articles other than those intended may damage the aerosol-generating device.

**[0006]** Furthermore, it may be desirable for the one or more electrical heater elements of an aerosol-generating device to reach different temperatures at different times (i.e. have a different heating profile) depending on the variety or flavour of aerosol-generating article used with the aerosol-generating device. Where this is the case, it would be desirable for the aerosol-generating device to be able to alter the temperature settings automatically without a user needing to enter any details manually.

**[0007]** Accordingly, it would be desirable to provide a system in which an aerosol-generating device is able to detect the presence of particular aerosol-generating articles. Where the aerosol-generating device does not recognise a particular aerosol-generating article, the aerosol-generating device may not activate the heater element to prevent a poor user experience. In addition, where the aerosol-generating device detects a particular recognised aerosol-generating article, it may run a particular heating profile configured specifically for use with that variety of aerosol-generating article.

**[0008]** In addition, it would be desirable to provide a system in which an aerosol-generating device is able to detect the presence of a particular aerosol-generating articles reliably and even after several uses of the aerosol-generating system.

**[0009]** The present disclosure relates to an aerosol-generating article. The aerosol-generating article may comprise an aerosol-generating substrate. The aerosol-generating article may comprise a downstream section provided downstream of the aerosol-generating substrate. The aerosol-generating article may comprise a taggant provided on the downstream section. The upstream end of the taggant may be at least 0.5 millimetres from the downstream end of the aerosol-generating substrate.

**[0010]** According to the present invention, there is provided an aerosol-generating article comprising an aerosol-generating substrate, a downstream section provided downstream of the aerosol-generating substrate, and a taggant provided on the downstream section, wherein the upstream end of the taggant is at least 0.5 millimetres from the downstream end of the aerosol-generating substrate.

**[0011]** The provision of a taggant on the aerosol-generating article may allow the aerosol-generating article to be detected and identified by an aerosol-generating device which includes a suitable detector. This identification may, for example, advantageously be used to verify the authenticity of the aerosol-generating article or to determine the appropriate heating profile for the aerosol-generating article.

**[0012]** As used herein with reference to the present invention, the term "taggant" refers to a chemical or physical marker added to a component, the presence of which may be detected by a suitable detector enabling the component to be identified. Physical taggants can take many different forms but are typically microscopic in size, included at low levels, and simple to detect. The taggant may comprise uniquely encoded material.

**[0013]** The taggant may be any taggant. For example, the taggant may comprise a photoluminescent material having an emission half-life of between 50 microseconds and 1000 microseconds after photoexcitation of the photoluminescent material.

**[0014]** As used herein with reference to the present invention, the term "emission half-life" refers to the time taken for an intensity of radiation emission by the photoluminescent material to decay by half after the photoluminescent material has been irradiated by a source of radiation and after the source of radiation has been removed or switched off.

**[0015]** Advantageously, a taggant comprising a photoluminescent material may be more difficult to copy during the production of counterfeit aerosol-generating articles when compared to known systems comprising identifiable ink patterns. For example, it may be impossible to produce a counterfeit article without determining at least one of the particular photoluminescent material, one or more wavelengths of radiation at which the photoluminescent material may be excited, and one or more wavelengths at which the photoluminescent material may emit radiation.

**[0016]** In use, the aerosol-generating article may be partially inserted into a cavity of a corresponding aerosol-generating device. In order to heat the aerosol-generating substrate, the aerosol-generating substrate is generally aligned with one or more electrical heater elements of the aerosol-generating device when the aerosol-generating article is fully inserted into the cavity. It is understood that the term "fully inserted" describes the position of the aerosol-generating article within a cavity of an aerosol-generating device when it is in the intended position for aerosol generation. It does not require that all of the length of the aerosol-generating article is within the cavity. As described below, a portion of the aerosol-generating article (for example a mouthpiece) may protrude from the cavity when the aerosol-generating article is fully inserted in the cavity.

**[0017]** Providing the taggant at a position 0.5 millimetres downstream of the aerosol-generating substrate affords several advantages. Firstly, the provision allows the detector to be located away and downstream of the portion of the cavity which is heated by one or more electrical heater elements. During repeated use, the portion of the cavity which becomes heated may develop a build-up of heating by-products and slurry which may condense on the inside wall of the cavity. Positioning the taggant at least 0.5 millimetres away from the aerosol-generating substrate may also allow the detector to be located at least 0.5 millimetres away from the portion of the cavity which is most susceptible to the build-up of heating by-products and slurry. This may advantageously improve the reliability of the detector.

**[0018]** Secondly, the provision prevents the taggant itself from being directly heated during use since the taggant is located at a position downstream of the location of the aerosol-generating article which needs to be heated. It is anticipated that some taggants may degrade or become damaged if they are heated. Locating the taggant downstream of the aerosol-generating substrate may therefore advantageously improve the reliability of the taggant detection since it may prevent the taggant from becoming damaged. In addition, this provision may prevent the taggant from coming into contact with heating by-products and slurry which, as discussed above, is most likely to be located in the portion of the cavity which is heated during use. This may therefore further improve the reliability of the taggant detection by preventing contamination of the taggant.

**[0019]** Thirdly, the provision allows the taggant to be located very close to the opening of the cavity when the aerosol-generating article is fully inserted in the cavity. This may allow the detector to be located close to the opening of the cavity. This may allow the detector to be readily cleaned using a suitable tool where heating by-products and slurry does become deposited on the detector. This may advantageously improve the reliability of the detector.

**[0020]** The upstream end of the taggant may be at least 0.5 millimetres from the downstream end of the aerosol-generating substrate. For example, the upstream end of the taggant may be at least 1 millimetre, at least 1.5 millimetres, or at least 2 millimetres from the downstream end of the aerosol-generating substrate.

**[0021]** The upstream end of the taggant may be located no more than 5 millimetres from the from the downstream end of the aerosol-generating substrate. For example, the upstream end of the taggant may be no more than 4 millimetres, no more than 3 millimetres, or no more than 2 millimetres from the downstream end of the aerosol-generating substrate.

**[0022]** The provision of the taggant being located no more than 5 millimetres from the from the downstream end of the aerosol-generating substrate may advantageously allow the aerosol-generating device to remain relatively compact since the taggant detector can still be relatively close to the one or more electrical heater elements of the aerosol-generating device. Moreover, this provision may also prevent the taggant from being covered by a user's lips during use. This may advantageously further improve the reliability of the taggant.

**[0023]** The upstream end of the taggant may be located about 2 millimetres from the downstream end of the aerosol-generating substrate.

**[0024]** The taggant may have any length. The taggant may have a length of at least 1 millimetre. For example, the taggant may have a length of at least 2 millimetres, at least 4 millimetres, at least 5 millimetres, or at least 6 millimetres.

**[0025]** The provision of a taggant having this length may advantageously improve the likelihood that the taggant will be detected by the detector and allow the taggant to be detected even when there are small variations in the length of the aerosol-generating article and or how far the aerosol-generating article is inserted into the cavity. This may advantageously improve the reliability of the taggant.

**[0026]** The taggant may have a length of no more than 10 millimetres. For example, the taggant may have a length of no more than 5 millimetres. The provision of a taggant not exceeding this length may advantageously improve the ease of manufacturing of the taggant since the taggant may only need to be applied to one component.

**[0027]** The taggant may have a length of about 6.5 millimetres.

**[0028]** As used herein, the term "length" denotes the dimension of a component of the aerosol-generating article in the longitudinal direction, from the component's furthest upstream point to the component's furthest downstream point. For example, it may be used to denote the dimension of the taggant from the furthest upstream point of the taggant to the furthest downstream point of the taggant in the longitudinal direction.

**[0029]** As used herein, the term "longitudinal" refers to the direction corresponding to the main longitudinal axis of the aerosol-generating article or aerosol-generating device, which extends between the upstream and downstream ends of the aerosol-generating article or aerosol-generating device. As used herein, the terms "upstream" and "downstream" describe the relative positions of elements, or portions of elements, of the aerosol-generating article or the aerosol-generating device in relation to the direction in which the aerosol is transported through the aerosol-generating article or aerosol-generating device during use. During use, air is drawn through the aerosol-generating article in the longitudinal direction.

**[0030]** The taggant may be provided on any component on the downstream section. For example, the taggant may be provided on one or more of an adhesive, a wrapper, a tipping paper, a filter plug, a susceptor, a mouthpiece filter, a space tube, or a flavourant where present. The taggant may be provided on more than one component. This may advantageously make detection of the taggant by the detector more reliable.

**[0031]** The downstream section may comprise a wrapper. The wrapper may circumscribe one or more components of the downstream section. The wrapper may join the downstream section to the aerosol-generating substrate. The downstream section may comprise more than one wrapper. For example, the downstream section may comprise a tipping paper or a combining wrapper. Where the downstream section comprises more than one wrapper, and the wrappers overlap, the taggant may be provided on the outermost wrapper. The outermost wrapper may be a paper wrapper or a non-paper wrapper. Suitable paper wrappers for use in specific embodiments of the invention are known in the art and include, but are not limited to: cigarette papers; and filter plug wraps.

**[0032]** The taggant may be provided on the inner surface of the wrapper. This may advantageously further protect the taggant from becoming damaged or contaminated. This may advantageously improve the reliability of the taggant.

**[0033]** The taggant may be provided on the inner surface of the outermost wrapper.

**[0034]** The taggant may be provided on the outer surface of the wrapper. The taggant may be provided on both the inner and outer surface of the wrapper.

**[0035]** The taggant may be printed on the inner surface of the wrapper. The taggant may be sprayed, or painted on the inner surface of the wrapper.

**[0036]** The upstream end of the taggant may be aligned with the upstream end of the wrapper.

**[0037]** This may advantageously simplify the manufacture of the aerosol-generating article.

**[0038]** The upstream end of the taggant may be at least 10 millimetres from the upstream end of the aerosol-generating article. For example, the upstream end of the taggant may be at least 10 millimetres, at least 15 millimetres, or at least 19 millimetres from the upstream end of the aerosol-generating article. This may advantageously allow the aerosol-generating device to be kept relatively compact.

**[0039]** The upstream end of the taggant may be about 19 millimetres from the upstream end of the aerosol-generating article.

**[0040]** The upstream end of the taggant may be at least 14 millimetres from the downstream end of the aerosol-generating article. For example, the upstream end of the taggant may be at least 14 millimetres, at least 20 millimetres, or at least 26 millimetres from the downstream end of the aerosol-generating article. This may prevent the taggant from being covered by a user's lips during use. This may advantageously further improve the reliability of the taggant.

**[0041]** The upstream end of the taggant may be about 26 millimetres from the downstream end of the aerosol-generating article.

**[0042]** The downstream end of the taggant may be at least 10 millimetres from the downstream end of the aerosol-generating article. For example, the downstream end of the taggant may be at least 15 millimetres, or at least 19 millimetres from the downstream end of the aerosol-generating article. This may prevent the taggant from being covered by a user's lips during use. This may advantageously further improve the reliability of the taggant.

**[0043]** The downstream end of the taggant may be about 19.5 millimetres from the downstream end of the aerosol-generating article.

**[0044]** The downstream end of the taggant may be at least 14 millimetres from the upstream end of the aerosol-generating article. For example, the downstream end of the taggant may be at least 20 millimetres, or at least 25 millimetres from the upstream end of the aerosol-generating article.

**[0045]** The downstream end of the taggant may be about 25.5 millimetres from the upstream end of the aerosol-generating article.

**[0046]** The downstream section may comprise a hollow tubular element. The upstream end of the taggant may overlay the hollow tubular element. The hollow tubular element may comprise cardboard. The hollow tubular element may be a cardboard tube. The hollow tubular element may be formed from cardboard. Advantageously, cardboard is a cost-effective material that provides a balance between being deformable in order to provide ease of insertion of the article into an aerosol-generating device and being sufficiently stiff to provide suitable engagement of the article with the interior of the device. A cardboard tube may therefore provide suitable resistance to deformation or compression during use.

**[0047]** Locating the upstream end of the taggant on the hollow tubular element may advantageously mean the taggant is located on a component which does not need to be heated during use. As a result, the taggant may avoid being heated during use which may improve the reliability of the taggant. In addition, it may allow the detector of the corresponding aerosol-generating article to be located distant from the at least one electrical heater elements of the aerosol-generating device. As set out above, this may advantageously improve the reliability of the taggant detector.

**[0048]** The downstream end of the taggant may overlay the hollow tubular element.

**[0049]** The aerosol-generating article may further comprise a ventilation zone at a location along the hollow tubular element of the downstream section, wherein the taggant is provided upstream of the ventilation zone.

**[0050]** Such a ventilated hollow tubular element may provide a particularly efficient cooling of the aerosol. Thus, a satisfactory cooling of the aerosol can be achieved even by means of a relatively short downstream section. This is especially desirable as it enables the provision of an aerosol-generating article wherein an aerosol-generating substrate (and particularly a tobacco-containing one) is heated rather than combusted that combines a satisfactory aerosol delivery with an efficient cooling of the aerosol down to temperatures that are desirable for the consumer.

**[0051]** The inventors have surprisingly found that such rapid cooling of the volatile species released upon heating the aerosol-generating substrate promotes enhances nucleation of aerosol particles. This effect is felt particularly when, as will be described in more detail below, the ventilation zone is arranged at a precisely defined location along the length of the hollow tubular element relative to other components of the aerosol-generating article. In effect, the inventors have found that the favourable effect of the enhanced nucleation is capable of significantly countering potentially less desirable effects of the dilution induced by the introduction of ventilation air.

**[0052]** The ventilation zone may typically comprise a plurality of perforations through the peripheral wall of the hollow tubular element. Preferably, the ventilation zone comprises at least one circumferential row of perforations. In some embodiments, the ventilation zone may comprise two circumferential rows of perforations. For example, the

perforations may be formed online during manufacturing of the aerosol-generating article. Preferably, each circumferential row of perforations comprises from 8 to 30 perforations. An aerosol-generating article in accordance with the present invention may have a ventilation level of at least about 2 percent.

**[0053]** The term "ventilation level" is used throughout the present specification to denote a volume ratio between of the airflow admitted into the aerosol-generating article via the ventilation zone (ventilation airflow) and the sum of the aerosol airflow and the ventilation airflow. The greater the ventilation level, the higher the dilution of the aerosol flow delivered to the consumer. The aerosol-generating article preferably has a ventilation level of at least 5 percent, more preferably at least 10 percent, even more preferably at least 12 percent or at least 15 percent.

**[0054]** An aerosol-generating article in accordance with the present invention may have a ventilation level of up to about 90 percent. Preferably, an aerosol-generating article in accordance with the present invention has a ventilation level of less than or equal to 80 percent, more preferably less than or equal to 70 percent, even more preferably less than or equal to 60 percent, most preferably less than or equal to 50 percent.

**[0055]** In use, when the aerosol-generating article is fully inserted into a cavity of an aerosol-generating device, the ventilation zone is provided on a portion of the aerosol-generating article which protrudes from the cavity to allow air to enter the ventilation zone. As a result, providing the taggant at a location upstream of the ventilation zone allows the taggant to be located within the cavity, to be detected by a detector, while the ventilation zone extends out of the cavity to prevent the ventilation zone being occluded.

**[0056]** The downstream end of the taggant may be provided at least 1 millimetre from the ventilation zone. For example, the downstream end of the taggant may be provided at least 2 millimetres, or at least 3 millimetres from the ventilation zone. The downstream end of the taggant may be provided about 3.5 millimetres from the ventilation zone.

**[0057]** The provision of the downstream end of the taggant close to the ventilation zone may allow both the taggant and the ventilation zone to be located close to the opening of the cavity, with the taggant being provided within the cavity, and the ventilation zone being provided outside of the cavity when the aerosol-generating article is fully inserted within the cavity. As described above, this may advantageously allow the taggant to be distant from the portion of the cavity which is heated. This may also prevent the ventilation zone being covered by a user's lips in use.

**[0058]** The downstream section may further comprise a mouthpiece element. The mouthpiece element may be located downstream of the hollow tubular element. The mouthpiece element may be adjacent the hollow tubular element. The downstream end of the mouthpiece element may define the downstream end of the aerosol-generating article.

**[0059]** The mouthpiece element may extend all the way to a mouth end of the aerosol-generating article. The mouthpiece element may comprise at least one mouthpiece filter segment formed of a fibrous filtration material. The mouthpiece element may be located downstream of a hollow tubular element, which is described above. The mouthpiece element may extend between the hollow tubular element and the downstream end of the aerosol-generating article.

**[0060]** The fibrous filtration material may be for filtering the aerosol that is generated from the aerosol-generating substrate. Suitable fibrous filtration materials would be known to the skilled person. Particularly preferably, the at least one mouthpiece filter segment comprises a cellulose acetate filter segment formed of cellulose acetate tow.

**[0061]** The downstream end of the taggant may be provided at least 5 millimetres from the upstream end of the mouthpiece element. For example, the downstream end of the taggant may be provided at least 10 millimetres, or at least 12.5 millimetres from the upstream end of the mouthpiece element. Providing the taggant upstream of the mouthpiece element may prevent the taggant from being covered by a user's lips during use. This may advantageously further improve the reliability of the taggant.

**[0062]** The aerosol-generating article may further comprise an upstream element provided upstream of the aerosol-generating substrate and abutting the upstream end of the aerosol-generating substrate.

**[0063]** The provision of an upstream element may advantageously protect the upstream end of the aerosol-generating substrate, which would otherwise be exposed. It may also reduce the risk of loose particles of the shredded tobacco material being lost from the upstream end of the aerosol-generating substrate.

**[0064]** Furthermore, the provision of an upstream element may facilitate the insertion of the upstream end of the aerosol-generating article into the cavity of a heating device and may protect the upstream end of the rod of aerosol-generating substrate during the insertion.

**[0065]** In the context of the present invention, the upstream element may also be sized to advantageously allow the taggant to be located directly adjacent a detector of an aerosol-generating device when the aerosol-generating article is fully inserted into a cavity of the aerosol-generating device. This may advantageously improve the reliability of the taggant detection.

**[0066]** The upstream end of the taggant may be provided at least 10 millimetres from the downstream end of the upstream element. For example, the upstream end of the taggant may be provided at least 12 millimetres, or at least 14 millimetres from the downstream end of the upstream element.

**[0067]** This may advantageously allow the taggant to be located near the opening of the cavity when the aerosol-generating article is fully inserted into the cavity of an aerosol-generating device.

**[0068]** The upstream element may comprise a hollow tubular element defining a longitudinal cavity providing an unrestricted flow channel. This arrangement may provide an optimised balance of RTD within the aerosol-generating article. With the arrangement of the articles of the present invention, the length and RTD of the upstream element and the aerosol-generating substrate are adapted such that changes to the material or construction of either of these elements does not have a significant impact on the overall RTD. The tubular form of the upstream element provides an unrestricted flow channel, which ensures that the RTD of the upstream element is very low and is dependent only on the length of the upstream element and not on the material that the upstream element is formed from. This means that changes can readily be made to the material of the upstream element, which may affect properties such as porosity, but will not affect the RTD contributed by the upstream element.

**[0069]** The upstream end of the taggant may be provided in the upstream half of the aerosol-generating article. The downstream end of the taggant may be provided in the downstream half of the aerosol-generating article.

**[0070]** The upstream end of the taggant may be provided in the upstream half of the aerosol-generating article and the downstream end of the taggant may be provided in the downstream half of the aerosol-generating article. Where this is the case, the taggant is provided at the midpoint along the length of the aerosol-generating article.

**[0071]** The taggant may be provided as a continuous band which circumscribes the downstream section.

**[0072]** The band may have a constant width around the circumference of the downstream section. The provision of a taggant as a continuous band which circumscribes the downstream section may advantageously allow the taggant to be detected by a detector regardless of the orientation which the aerosol-generating article is inserted into the cavity of the aerosol-generating article. This may advantageously improve the reliability of the taggant detection.

**[0073]** The taggant may be provided in a concentration of at least 30 milligrams per square metre. For example, the taggant may be provided in a concentration of at least 50 milligrams per square metre, at least 100 milligrams per square metre, or at least 150 milligrams per square metre.

**[0074]** The taggant may be provided in a concentration of no more than 420 milligrams per square metre. For example, the taggant may be provided in a concentration of no more than 400 milligrams per square metre, no more than 350 milligrams per square metre, or no more than 300 milligrams per square metre.

**[0075]** The taggant may be provided in a concentration of between 30 milligrams per square metre and 420 milligrams per square metre.

**[0076]** The taggant may be provided in a concentration of at least 620 milligrams per square metre. For example, the taggant may be provided in a concentration of at least 670 milligrams per square metre, at least 720 milligrams per square metre, at least 770 milligrams per square metre, or at least 820 milligrams per square metre.

**[0077]** The may be provided in a concentration of no more than 1000 milligrams per square metre. For example, the taggant may be provided in a concentration of no more than 950 milligrams per square metre, no more than 900 milligrams per square metre, or no more than 850 milligrams per square metre.

**[0078]** The provision of a taggant in this concentration range may advantageously ensure reliable detection of the taggant.

**[0079]** The present disclosure is also relates to an aerosol-generating system. The aerosol-generating system may comprise an aerosol-generating article as described above. The aerosol-generating system may comprise an aerosol-generating device. The aerosol-generating device may comprise a cavity for receiving a portion of the aerosol-generating article. The aerosol-generating device may comprise a detector capable of detecting the presence of the taggant. The detector may be arranged to be substantially aligned with the taggant when the aerosol-generating article is fully inserted into the cavity.

**[0080]** According to the invention, there is provided an aerosol-generating system comprising an aerosol-generating article according to any preceding claim, and an aerosol-generating device. The aerosol-generating device comprises a cavity for receiving a portion of the aerosol-generating article, a detector capable of detecting the presence of the taggant, the detector being arranged to be substantially aligned with the taggant when the aerosol-generating article is fully inserted into the cavity.

**[0081]** The device cavity may be referred to as the heating chamber of the aerosol-generating device. The device cavity may extend between a distal end and a mouth, or proximal, end. The distal end of the device cavity may be a closed end and the mouth, or proximal, end of the device cavity may be an open end. An aerosol-generating article may be inserted into the device cavity, or heating chamber, via the open end of the device cavity. The device cavity may be cylindrical in shape so as to conform to the same shape of an aerosol-generating article.

**[0082]** The provision of the taggant being substantially aligned with the detector when the aerosol-generating article is fully inserted into the cavity may advantageously allow for reliable taggant detection by the detector.

**[0083]** The aerosol-generating device may further comprise one or more additional components such as a heater, a user interface, a power source, a controller.

**[0084]** The aerosol-generating device may comprise a heater. The heater may be any suitable type of heater. Preferably, the heater is an external heater. Preferably, the heater may externally heat the aerosol-generating article when received within the aerosol-generating device. Such an external heater may circumscribe the aerosol-generating article when inserted in or received within the aerosol-generating device.

**[0085]** The heater may be configured to circumscribe the aerosol-generating article when the aerosol-generating article is received within the device cavity.

**[0086]** In some embodiments, the heater is arranged to heat the outer surface of the aerosol-generating substrate. In some embodiments, the heater is arranged for insertion into an aerosol-generating substrate when the aerosol-generating substrate is received within the cavity. The heater may be positioned within the device cavity, or heating chamber. Such a heater may be described as an external heater.

**[0087]** The detector may be located no more than 4 millimetres from the downstream end of the cavity.

**[0088]** For example, the detector may be located no more than 2 millimetres, or no more than 1 millimetre from the downstream end of the cavity.

**[0089]** As described above, providing the detector close to the opening of the cavity may allow the detector to be readily cleaned using a suitable tool where heating by-products and slurry does become deposited on the detector.

**[0090]** The invention is defined in the claims. However, below there is provided a non-exhaustive list of non-limiting examples. Any one or more of the features of these examples may be combined with any one or more features of another example, embodiment, or aspect described herein.

**[0091]** Example 1. An aerosol-generating article comprising an aerosol-generating substrate, a downstream section provided downstream of the aerosol-generating substrate, and a taggant provided on the downstream section, wherein the upstream end of the taggant is at least 0.5 millimetres from the downstream end of the aerosol-generating substrate.

**[0092]** Example 2. An aerosol-generating article according to Example 1, wherein the taggant has a length of greater than 2 millimetres.

**[0093]** Example 3. An aerosol-generating article according to Example 1 or Example 2, wherein the taggant has a length of greater than 4 millimetres.

**[0094]** Example 4. An aerosol-generating article according to any preceding Example, wherein the downstream section further comprises a wrapper, the taggant being provided on the wrapper.

**[0095]** Example 5. An aerosol-generating article according to Example 4, wherein the taggant is provided on the inner surface of the wrapper.

**[0096]** Example 6. An aerosol-generating article according to Example 5, wherein the taggant is printed on the inner surface of the wrapper.

**[0097]** Example 7. An aerosol-generating article according to any one of Example 4 to 6, wherein the upstream end of the taggant is aligned with the upstream end of the wrapper.

**[0098]** Example 8. An aerosol-generating article according to any one of Examples 4 to 7, wherein the taggant is provided in a concentration of between 30 milligrams per square metre to 420 milligrams per square meter.

**[0099]** Example 9. An aerosol-generating article according to any one of Examples 4 to 7, wherein the taggant is provided in a concentration of at least 620 milligrams per square meter.

**[0100]** Example 10. An aerosol-generating article according to any preceding Example, wherein the upstream end of the taggant is at least 10 millimetres from the upstream end of the aerosol-generating article.

**[0101]** Example 11. An aerosol-generating article according to any preceding Example, wherein the upstream end of the taggant is at least 14 millimetres from the downstream end of the aerosol-generating article.

**[0102]** Example 12. An aerosol-generating article according to any preceding Example, wherein the downstream end of the taggant is at least 10 millimetres from the downstream end of the aerosol-generating article.

**[0103]** Example 13. An aerosol-generating article according to any preceding Example, wherein the downstream end of the taggant is at least 14 millimetres from the upstream end of the aerosol-generating article.

**[0104]** Example 14. An aerosol-generating article according to any preceding Example, wherein the downstream section further comprises a hollow tubular element, the upstream end of the taggant overlaying the hollow tubular element.

**[0105]** Example 15. An aerosol-generating article according to Example 14, wherein the downstream end of the taggant overlays the hollow tubular element.

**[0106]** Example 16. An aerosol-generating article according to Example 14 or Example 15, further comprising a ventilation zone at a location along the hollow tubular element of the downstream section, wherein the taggant is provided upstream of the ventilation zone.

**[0107]** Example 17. An aerosol-generating article according to Example 16, wherein the downstream end of the taggant is provided at least 1 millimetre from the ventilation zone.

**[0108]** Example 18. An aerosol-generating article according to any preceding Example, wherein the downstream section further comprises a mouthpiece element.

**[0109]** Example 19. An aerosol-generating article according to Example 18, wherein the downstream end of the taggant is provided at least 5 millimetres from the upstream end of the mouthpiece element.

**[0110]** Example 20. An aerosol-generating article according to any preceding Example, further comprising an upstream element provided upstream of the aerosol-generating substrate and abutting the upstream end of the aerosol-generating substrate.

**[0111]** Example 21. An aerosol-generating article according to Example 20, wherein upstream end of the taggant is provided at least 10 millimetres from the downstream end of the upstream element.

**[0112]** Example 22. An aerosol-generating article according to Example 20 or Example 21, wherein upstream element comprises a hollow tubular element defining a longitudinal cavity providing an unrestricted flow channel.

**[0113]** Example 23. An aerosol-generating article according to any preceding Example, wherein the upstream end of the taggant is provided in the upstream half of the aerosol-generating article, and the downstream end of the taggant is provided in the downstream half of the aerosol-generating article.

**[0114]** Example 24. An aerosol-generating article according to any preceding Example, wherein the taggant is provided as a continuous band which circumscribes the downstream section.

**[0115]** Example 25. An aerosol-generating system comprising an aerosol-generating article according to any preceding Example, and an aerosol-generating device, the aerosol-generating device comprising a cavity for receiving a portion of the aerosol-generating article, and a detector capable of detecting the presence of the taggant, the detector being arranged to be substantially aligned with the taggant when the aerosol-generating article is fully inserted into the cavity.

**[0116]** Example 26. An aerosol-generating system according to Example 25, wherein the detector is located no more than 2 millimetres from the downstream end of the cavity.

**[0117]** In the following non-limiting examples, the invention will be further described with reference to the drawings of the accompanying Figures, in which:

**[0118]** FIG. **1** shows a schematic side perspective view of an aerosol-generating article in accordance with an embodiment of the invention; and

**[0119]** FIG. **2** shows a schematic side sectional view of the aerosol-generating system comprising an aerosol-generating article in accordance with an embodiment of the invention and an aerosol-generating device.

**[0120]** The aerosol-generating article **10** shown in FIG. **1** comprises an aerosol-generating substrate **12** and a downstream section at a location downstream of the aerosol-generating substrate **12**. The aerosol-generating article **10** extends from an upstream or distal end **16** to a downstream or mouth end **18**. The downstream section comprises a hollow tubular element **20** and a mouthpiece element **50**.

**[0121]** The aerosol-generating article **10** has an overall length of about 45 millimetres and an outer diameter of about 7.2 mm.

**[0122]** The aerosol-generating substrate **12** comprises a shredded tobacco material. The aerosol-generating substrate **12** comprises 150 milligrams of a shredded tobacco material comprising from 13 percent by weight to 16 percent by weight of glycerine. The density of the aerosol-generating substrate is about 300 mg per cubic centimetre. The RTD of the aerosol-generating substrate **12** is between about 6 to 8

mm $H_2O$. The aerosol-generating substrate **12** is individually wrapped by a plug wrap (not shown).

**[0123]** The hollow tubular element **20** is located immediately downstream of the aerosol-generating substrate **12**, the hollow tubular element **20** being in longitudinal alignment with the aerosol-generating substrate **12**. The upstream end of the hollow tubular element **20** abuts the downstream end of the aerosol-generating substrate **12**.

**[0124]** The hollow tubular element **20** defines a hollow section of the aerosol-generating article **10**. The hollow tubular element does not substantially contribute to the overall RTD of the aerosol-generating article. In more detail, an RTD of the hollow tubular element **20** is about 0 mm $H_2O$.

**[0125]** The hollow tubular element **20** is provided in the form of a hollow cylindrical tube made of cardboard. The hollow tubular element **20** defines an internal cavity **22** that extends all the way from an upstream end of the hollow tubular element **20** to a downstream end of the hollow tubular element **20**. The internal cavity **22** is substantially empty, and so substantially unrestricted airflow is enabled along the internal cavity **22**. The hollow tubular element **20** does not substantially contribute to the overall RTD of the aerosol-generating article **10**.

**[0126]** The hollow tubular element **20** has a length of about 21 millimetres, an external diameter of about 7.2 millimetres, and an internal diameter of about 6.7 millimetres. Thus, a thickness of a peripheral wall of the hollow tubular element **20** is about 0.25 millimetres.

**[0127]** The aerosol-generating article **10** comprises a ventilation zone **30** provided at a location along the hollow tubular element **20**. In more detail, the ventilation zone **30** is provided at about 16 millimetres from the downstream end **18** of the article **10**. The ventilation zone **30** is provided at about 12 mm downstream from the downstream end of the aerosol-generating substrate **12**. The ventilation zone **30** is provided at about 9 mm upstream from the upstream end of the mouthpiece element **50**. The ventilation zone **30** comprises a circumferential row of openings or perforations circumscribing the hollow tubular element **20**. The perforations of the ventilation zone **30** extend through the wall of the hollow tubular element **20**, in order to allow fluid ingress into the internal cavity **22** from the exterior of the article **10**. A ventilation level of the aerosol-generating article **10** is about 16 percent.

**[0128]** On top of the aerosol-generating substrate **12** and a downstream section at a location downstream of the aerosol-generating substrate **12**, the aerosol-generating article **100** comprises an upstream section at a location upstream of the aerosol-generating substrate **12**. As such, the aerosol-generating article **10** extends from a distal end **16** substantially coinciding with an upstream end of the upstream section to a mouth end or downstream end **18** substantially coinciding with a downstream end of the downstream section.

**[0129]** The upstream section comprises an upstream element **42** located immediately upstream of the aerosol-generating substrate **12**, the upstream element **42** being in longitudinal alignment with the aerosol-generating substrate **12**. The downstream end of the upstream element **42** abuts the upstream end of the aerosol-generating substrate **12**. The upstream element **42** is provided in the form of a hollow cylindrical plug of cellulose acetate tow having a wall thickness of about 1 mm and defining an internal cavity **23**. The upstream element **42** has a length of about 5 millimetres. An external diameter of the upstream element **42** is about 7.1 mm. An internal diameter of the upstream element **42** is about 5.1 mm.

**[0130]** The mouthpiece element **50** extends from the downstream end of the hollow tubular element **20** to the downstream or mouth end of the aerosol-generating article **10**. The mouthpiece element **50** has a length of about 7 mm. An external diameter of the mouthpiece element **50** is about 7.2 mm. The mouthpiece element **50** comprises a low-density, cellulose acetate filter segment. The RTD of the mouthpiece element **50** is about 8 mm $H_2O$. The mouthpiece element **50** may be individually wrapped by a plug wrap (not shown).

**[0131]** As shown in FIG. **1**, the article **10** comprises an upstream wrapper **44** circumscribing the upstream element **42**, the aerosol-generating substrate **12** and the hollow tubular element **20**. The ventilation zone **30** may also comprise a circumferential row of perforations provided on the upstream wrapper **44**. The perforations of the upstream wrapper **44** overlap the perforations provided on the hollow tubular element **20**. Accordingly, the upstream wrapper **44** overlies the perforations of the ventilation zone **30** provided on the hollow tubular element **20**.

**[0132]** The article **10** also comprises a tipping wrapper **52** circumscribing the hollow tubular element **20** and the mouthpiece element **50**. The tipping wrapper **52** overlies the portion of the upstream wrapper **44** that overlies the hollow tubular element **20**. This way the tipping wrapper **52** effectively joins the mouthpiece element **50** to the rest of the components of the article **10**. The width of the tipper wrapper **52** is about 26 mm. Additionally, the ventilation zone **30** may comprise a circumferential row of perforations provided on the tipping wrapper **52**. The perforations of the tipping wrapper **52** overlap the perforations provided on the hollow tubular element **20** and the upstream wrapper **44**. Accordingly, the tipping wrapper **52** overlies the perforations of the ventilation zone **30** provided on the hollow tubular element **20** and the upstream wrapper **44**.

**[0133]** A taggant **60** is provided as a continuous band circumscribing the downstream section of the aerosol-generating article **10**. The taggant **60** is printed on the inner surface of the tipping wrapper **52**. The upstream end of the taggant **60** is located 2 millimetres downstream of the downstream end of the aerosol-generating substrate **12**. The taggant **60** has a length of 6.5 millimetres. The upstream end of the taggant **60** is aligned with the upstream end of the tipping wrapper **52**. The downstream end of the taggant **60** is 3.5 millimetres upstream from the ventilation zone **30**. Accordingly, the entire length of the taggant **60** overlays the hollow tubular element **20**. The taggant **60** is provided in an concentration of about 200 milligrams per square metre.

**[0134]** FIG. **2** illustrates an aerosol-generating system **100** comprising an exemplary aerosol-generating device **1** and the aerosol-generating article **10**, equivalent to that shown in FIG. **1**. FIG. **2** illustrates a downstream, mouth end portion of the aerosol-generating device **1** where the device cavity is defined and the aerosol-generating article **10** can be received. The aerosol-generating device **1** comprises a housing (or body) **4**, extending between a mouth end **2** and a distal end (not shown). The housing **4** comprises a peripheral wall **6**. The peripheral wall **6** defines a device cavity for receiving an aerosol-generating article **10**. The device cavity is defined by a closed, distal end and an open, mouth end. The mouth end of the device cavity is located at the mouth

end of the aerosol-generating device **1**. The aerosol-generating article **10** is configured to be received through the mouth end of the device cavity and is configured to abut a closed end of the device cavity.

**[0135]** A device air flow channel **5** is defined within the peripheral wall **6**. The air-flow channel **5** extends between an inlet **7** located at the mouth end of the aerosol-generating device **1** and the closed end of the device cavity. Air may enter the aerosol-generating substrate **12** via an aperture (not shown) provided at the closed end of the device cavity, ensuring fluid communication between the air flow channel **5** and the aerosol-generating substrate **12**.

**[0136]** The aerosol-generating device **1** further comprises a heater (not shown) and a power source (not shown) for supplying power to the heater. A controller (not shown) is also provided to control such supply of power to the heater. The heater is configured to controllably heat the aerosol-generating article **10** during use, when the aerosol-generating article **1** is received within the device **1**. The heater is preferably arranged to externally heat the aerosol-generating substrate **12** for optimal aerosol generation. The ventilation zone **30** is arranged to be exposed when the aerosol-generating article **10** is received within the aerosol-generating device **1**.

**[0137]** In the embodiment shown in FIG. **2**, the device cavity defined by the peripheral wall **6** is 28 mm in length. When the article **10** is received within the device cavity, the upstream section, the aerosol-generating substrate **12** and an upstream portion of the hollow tubular element **20** are received within the device cavity. Such an upstream portion of the hollow tubular element **20** is 11 mm in length. Accordingly, about 28 mm of the article **10** is received within the device **1** and about 17 mm of the article **10** is located outside of the device **1**. In other words, about 17 mm of the article **10** protrudes from the device **1** when the article **10** is received therein. Such a length PL of the article **10** protruding from the device **1** is shown in FIG. **2**.

**[0138]** As a result, the ventilation zone **30** is advantageously located outside of the device **1** when the article **10** is inserted in the device **1**. Where the device cavity is 28 mm long, the ventilation zone **30** is located 1 mm downstream from the mouth end **2** of the device **1** when the article **10** is received within the device **1**.

**[0139]** The aerosol-generating device **1** further comprises a taggant detector **8** located near the device cavity. the taggant detector **8** is located about 2 millimetres from the downstream end, or mouth end, of the device cavity. The taggant detector may be configured to detect the presence, absence, and type of taggant **60** located on an aerosol-generating article **10**.

**[0140]** In use, the aerosol-generating article **10** is inserted into the device cavity of the aerosol-generating device **1**. When the aerosol-generating article **10** is fully inserted into the device cavity, the taggant **60** of the aerosol-generating article **10** is aligned with the taggant detector **8** of the aerosol-generating device **1**. The taggant detector **8** detects the taggant **60** confirming the identity of the aerosol-generating article. The heater (not shown) is then activated according to a predetermined heating profile to generate an aerosol in the aerosol-generating substrate **12**. The taggant **60** remains distant from the area which is heated thereby preventing the taggant **60** from being damaged. Similarly, the detector **60** also remains distant from the area which is heated thereby preventing build-up of heating by-products and slurry on the detector **8**.

**[0141]** For the purpose of the present description and of the appended claims, except where otherwise indicated, all numbers expressing amounts, quantities, percentages, and so forth, are to be understood as being modified in all instances by the term "about". Also, all ranges include the maximum and minimum points disclosed and include any intermediate ranges therein, which may or may not be specifically enumerated herein. In this context, therefore, a number A is understood as A±10% of A. Within this context, a number A may be considered to include numerical values that are within general standard error for the measurement of the property that the number A modifies. The number A, in some instances as used in the appended claims, may deviate by the percentages enumerated above provided that the amount by which A deviates does not materially affect the basic and novel characteristic(s) of the claimed invention. Also, all ranges include the maximum and minimum points disclosed and include any intermediate ranges therein, which may or may not be specifically enumerated herein.

**1.-26.** (canceled)

**27.** An aerosol-generating article, comprising:

an aerosol-generating substrate;

a downstream section disposed downstream of the aerosol-generating substrate; and

a taggant disposed on the downstream section, wherein an upstream end of the taggant is at least 0.5 millimetre from a downstream end of the aerosol-generating substrate,

wherein the taggant is a chemical or physical marker added to a component, a presence of which may be detected by a suitable detector configured to enable the component to be identified,

wherein the downstream section further comprises a wrapper, the taggant being disposed on the wrapper, and

wherein the upstream end of the taggant is aligned with an upstream end of the wrapper.

**28.** The aerosol-generating article according to claim **27**, wherein the taggant has a length of greater than 2 millimetres.

**29.** The aerosol-generating article according to claim **27**, wherein the taggant has a length of greater than 4 millimetres.

**30.** The aerosol-generating article according to claim **27**, wherein the taggant is disposed on an inner surface of the wrapper.

**31.** The aerosol-generating article according to claim **30**, wherein the taggant is printed on the inner surface of the wrapper.

**32.** The aerosol-generating article according to claim **27**, wherein the taggant is provided in a concentration of between 30 milligrams per square metre to 420 milligrams per square meter.

**33.** The aerosol-generating article according to claim **27**, wherein the taggant is provided in a concentration of at least 620 milligrams per square meter.

**34.** The aerosol-generating article according to claim **27**, wherein the upstream end of the taggant is at least 10 millimetres from an upstream end of the aerosol-generating article.

**35**. The aerosol-generating article according to claim **27**, wherein the upstream end of the taggant is at least 14 millimetres from a downstream end of the aerosol-generating article.

**36**. The aerosol-generating article according to claim **27**, wherein the downstream end of the taggant is at least 10 millimetres from a downstream end of the aerosol-generating article.

**37**. The aerosol-generating article according to claim **27**, wherein a downstream end of the taggant is at least 14 millimetres from an upstream end of the aerosol-generating article.

**38**. The aerosol-generating article according to claim **27**, wherein the downstream section further comprises a hollow tubular element, the upstream end of the taggant overlaying the hollow tubular element.

**39**. The aerosol-generating article according to claim **38**, wherein a downstream end of the taggant overlays the hollow tubular element.

**40**. The aerosol-generating article according to claim **38**, further comprising a ventilation zone at a location along the hollow tubular element of the downstream section, wherein the taggant is disposed upstream of the ventilation zone.

**41**. The aerosol-generating article according to claim **40**, wherein a downstream end of the taggant is provided at least 1 millimetre from the ventilation zone.

**42**. The aerosol-generating article according to claim **27**, wherein the downstream section further comprises a mouthpiece element.

**43**. The aerosol-generating article according to claim **42**, wherein a downstream end of the taggant is provided at least 5 millimetres from an upstream end of the mouthpiece element.

**44**. The aerosol-generating article according to claim **27**, further comprising an upstream element disposed upstream of the aerosol-generating substrate and abutting an upstream end of the aerosol-generating substrate.

**45**. The aerosol-generating article according to claim **44**, wherein the upstream end of the taggant is provided at least 10 millimetres from a downstream end of the upstream element.

**46**. The aerosol-generating article according to claim **44**, wherein upstream element comprises a hollow tubular element defining a longitudinal cavity providing an unrestricted flow channel.

**47**. The aerosol-generating article according to claim **27**, wherein the upstream end of the taggant is disposed in the upstream half of the aerosol-generating article, and a downstream end of the taggant is disposed in a downstream half of the aerosol-generating article.

**48**. The aerosol-generating article according to claim **27**, wherein the taggant is provided as a continuous band that circumscribes the downstream section.

**49**. An aerosol-generating system comprising an aerosol-generating article according to claim **27**, and an aerosol-generating device, the aerosol-generating device comprising:

a cavity configured to receive a portion of the aerosol-generating article; and

a detector configured to detect a presence of the taggant, the detector being arranged to be substantially aligned with the taggant when the aerosol-generating article is fully inserted into the cavity,

wherein the taggant is a chemical or physical marker added to a component, the presence of which may be detected by a suitable detector configured to enable the component to be identified.

**50**. The aerosol-generating system according to claim **49**, wherein the detector is disposed no more than 2 millimetres from a downstream end of the cavity.

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