

According to one aspect, there is provided a heated aerosol-generating article comprising a plurality of elements assembled in the form of a rod, the plurality of elements including an aerosol-forming substrate, an aerosol-cooling element located downstream from the aerosol-forming substrate within the rod, and a filter located downstream from the aerosol-cooling element within the rod, in which the aerosol-cooling element is formed from a crimped and gathered polymeric sheet such that the aerosol-cooling element comprises a plurality of longitudinally extending channels and has a porosity of between 50% and 90% in the longitudinal direction, the longitudinal porosity being derived from a ratio of the cross-sectional area of material forming the aerosol-cooling element and an internal cross-sectional area of the aerosol-generating article at the portion contacting the aerosol-cooling element, wherein the aerosol-cooling element has a total surface area of between 300 mm² per mm length of the aerosol-cooling element and 1000 mm² per mm length of the aerosol-cooling element, and wherein the external diameter of the article is between 5 mm and 12 mm.

As used herein, the term aerosol-generating article is used to denote an article comprising an aerosol-forming substrate that is capable of releasing volatile compounds that can form an aerosol. An aerosol-generating article may be a non-combustible aerosol-generating article, which is an article that releases volatile compounds without the combustion of the aerosol-forming substrate. An aerosol-generating article may be a heated aerosol-generating article, which is an aerosol-generating article comprising an aerosol-forming substrate that is intended to be heated rather than combusted in order to release volatile compounds that can form an aerosol. A heated aerosol-generating article may comprise an on-board heating means forming part of the aerosol-generating article, or may be configured to interact with an external heater forming part of a separate aerosol-generating device

An aerosol-generating article may be a smoking article that generates an aerosol that is directly inhalable into a user's lungs through the user's mouth. An aerosol-generating article may resemble a conventional smoking article, such as a cigarette and may comprise tobacco. An aerosol-generating article may be disposable. An aerosol-generating article may alternatively be partially-reusable and comprise a replenishable or replaceable aerosol-forming substrate.

As used herein, the term 'aerosol-forming substrate' relates to a substrate capable of releasing volatile compounds that can form an aerosol. Such volatile compounds may be released by heating the aerosol-forming substrate. An aerosol-forming substrate may be adsorbed, coated, impregnated or otherwise loaded onto a carrier or support. An aerosol-forming substrate may conveniently be part of an aerosol-generating article or smoking article.

An aerosol-forming substrate may comprise nicotine. An aerosol-forming substrate may comprise tobacco, for example may comprise a tobacco-containing material containing volatile tobacco flavour compounds, which are released from the aerosol-forming substrate upon heating. In preferred embodiments an aerosol-forming substrate may comprise homogenised

tobacco material, for example cast leaf tobacco.

As used herein, an 'aerosol-generating device' relates to a device that interacts with an aerosol-forming substrate to generate an aerosol. The aerosol-forming substrate forms part of an aerosol-generating article, for example part of a smoking article. An aerosol-generating device may comprise one or more components used to supply energy from a power supply to an aerosol-forming substrate to generate an aerosol.

An aerosol-generating device may be described as a heated aerosol-generating device, which is an aerosol-generating device comprising a heater. The heater is preferably used to heat an aerosol-forming substrate of an aerosol-generating article to generate an aerosol.

An aerosol-generating device may be an electrically heated aerosol-generating device, which is an aerosol-generating device comprising a heater that is operated by electrical power to heat an aerosol-forming substrate of an aerosol-generating article to generate an aerosol. An aerosol-generating device may be a gas-heated aerosol-generating device. An aerosol-

CLAIMS:

1. ~~A heated aerosol-generating article (10) comprising a plurality of elements assembled in the form of a rod (11), the plurality of elements including an aerosol-forming substrate (20), an aerosol-cooling element (40) located downstream from the aerosol-forming substrate (20) within the rod (11), and a filter located downstream from the aerosol-cooling element (40) within the rod (11), in which the aerosol-cooling element (40) is formed from a crimped and gathered polymeric sheet such that the aerosol-cooling element comprises a plurality of longitudinally extending channels and has a porosity of between 50% and 90% in the longitudinal direction.~~

2. ~~A heated aerosol-generating article (10) according to claim wherein the aerosol-cooling element (40) has a total surface area of between 300 mm² per mm length of the aerosol-cooling element and 1000 mm² per mm length of the aerosol-cooling element.~~

3. ~~A heated aerosol-generating article (10) according to any preceding claim in which the aerosol-cooling element (40) comprises a polymeric sheet material selected from the group consisting of polyethylene, polypropylene, polyvinylchloride, polyethylene terephthalate, polylactic acid, and cellulose acetate.~~

4. ~~A heated aerosol-generating article (10) according to any preceding claim in which an aerosol evolved from the aerosol-forming substrate (20) contains water vapour and a proportion of this water vapour is condensed to form water droplets as the aerosol is drawn through the aerosol-cooling element (40).~~

5. ~~A heated aerosol-generating article (10) according to any preceding claim in which the aerosol-cooling element (40) is between 7 mm and 28 mm in length.~~

6. ~~A heated aerosol-generating article (10) according to any preceding claim in which the aerosol-cooling element (40) is configured to cool an aerosol evolved from the aerosol-forming substrate (20) by greater than 10 degrees Celsius as the aerosol is drawn through the aerosol-cooling element (40).~~

7. ~~A heated aerosol-generating article (10) according to any preceding claim in which water vapour content of an aerosol evolved from the aerosol-forming substrate (20) is reduced by between 20% and 90% on being drawn through the aerosol-cooling element (40).~~

8. — A heated aerosol-generating article (10) according to any preceding claim in which the aerosol-cooling element (40) comprises a material that undergoes a phase transition when an aerosol evolved from the aerosol-forming substrate (40) is drawn through the aerosol-cooling element (40).

9. — A heated aerosol-generating article (10) according to any preceding claim comprising a spacer element (30) located between the aerosol-forming substrate (20) and the aerosol-cooling element (40) within the rod (11).

CLAIMS:

1. A heated aerosol-generating article comprising a plurality of elements assembled in the form of a rod, the plurality of elements including an aerosol-forming substrate, an aerosol-cooling element located downstream from the aerosol-forming substrate within the rod, and a filter located downstream from the aerosol-cooling element within the rod, in which the aerosol-cooling element is formed from a crimped and gathered polymeric sheet such that the aerosol-cooling element comprises a plurality of longitudinally extending channels and has a porosity of between 50% and 90% in the longitudinal direction, the longitudinal porosity being derived from a ratio of the cross-sectional area of material forming the aerosol-cooling element and an internal cross-sectional area of the aerosol-generating article at the portion contacting the aerosol-cooling element, wherein the aerosol-cooling element has a total surface area of between 300 mm² per mm length of the aerosol-cooling element and 1000 mm² per mm length of the aerosol-cooling element, and wherein the external diameter of the article is between 5 mm and 12 mm.
2. A heated aerosol-generating article according to any preceding claim in which the aerosol-cooling element comprises a polymeric sheet material selected from the group consisting of polyethylene, polypropylene, polyvinylchloride, polyethylene terephthalate, polylactic acid, and cellulose acetate.
3. A heated aerosol-generating article according to any preceding claim in which an aerosol evolved from the aerosol-forming substrate contains water vapour and a proportion of this water vapour is condensed to form water droplets as the aerosol is drawn through the aerosol-cooling element.
4. A heated aerosol-generating article according to any preceding claim in which the aerosol-cooling element is between 7 mm and 28 mm in length.
5. A heated aerosol-generating article according to any preceding claim in which the aerosol-cooling element is configured to cool an aerosol evolved from the aerosol-forming substrate by greater than 10 degrees Celsius as the aerosol is drawn through the aerosol-cooling element.
6. A heated aerosol-generating article according to any preceding claim in which water vapour content of an aerosol evolved from the aerosol-forming substrate is reduced by between 20% and 90% on being drawn through the aerosol-cooling element.

7. A heated aerosol-generating article according to any preceding claim in which the aerosol-cooling element comprises a material that undergoes a phase transition when an aerosol evolved from the aerosol-forming substrate is drawn through the aerosol-cooling element.

8. A heated aerosol-generating article according to any preceding claim comprising a spacer element located between the aerosol-forming substrate and the aerosol-cooling element within the rod.