SMOKING ARTICLE FILTER INCLUDING DEGRADABLE FILTER COMPONENT

The present invention relates to a smoking article filter comprising a degradable filter component and to a smoking article including such a filter. The present invention further relates to a method for the production of a filter including a degradable filter component.

Filter cigarettes typically comprise a cylindrical rod of tobacco cut filler surrounded by a paper wrapper and a cylindrical filter axially aligned in an abutting end-to-end relationship with the wrapped tobacco rod. The cylindrical filter typically comprises a filtration material, usually cellulose acetate tow, circumscribed by a paper plug wrap. Conventionally, the wrapped tobacco rod and the filter are joined by a band of tipping wrapper, normally formed of a paper material, which circumscribes the entire length of the filter and an adjacent portion of the wrapped tobacco rod.

A number of smoking articles in which tobacco is heated rather than combusted have also been proposed in the art. In heated smoking articles, an aerosol is generated by heating an aerosol generating substrate, such as tobacco. Known heated smoking articles include, for example, smoking articles in which an aerosol is generated by electrical heating or by the transfer of heat from a combustible fuel element or heat source to an aerosol forming substrate. During smoking, volatile compounds are released from the aerosol forming substrate by heat transfer from the heat source and entrained in air drawn through the smoking article. As the released compounds cool they condense to form an aerosol that is inhaled by the consumer. Also known are smoking articles in which a nicotine-containing aerosol is generated from a tobacco material, tobacco extract or other nicotine source, without combustion and in some cases without heating, for example through a chemical reaction.

It has been previously proposed to produce filters for cigarettes using biodegradable or water soluble materials so that the cigarette butt that remains after smoking can be more readily degraded after its disposal. For example, it has been proposed to form fibrous filter segments with fibres of a biodegradable thermoplastic material, either alone or in combination with conventional cellulose acetate fibres. However, the production of such filter segments typically requires different manufacturing apparatus and techniques to those used for conventional cellulose acetate filter segments and this can have an adverse effect on productivity and costs.

It would be desirable to provide a filter for a smoking article that includes a degradable filter component which can be readily broken down or degraded in order to facilitate the disintegration and degradation of the filter as a whole after the disposal of the filter. It would be particularly desirable to provide such a filter that can be readily manufactured using existing apparatus and techniques without significantly impacting productivity.

There is provided a filter for a smoking article, the filter including a filter component formed from a solution of cellulose acetate and a degradable

polymer in acetone, the degradable polymer being soluble in acetone and degrading in the presence of water.

According to the invention, there is provided a filter for a smoking article, the filter including a filter component formed from a solution of cellulose acetate and a degradable polymer in acetone, the degradable polymer being soluble in acetone and degrading in the presence of water, wherein the degradable polymer is polylactic-co-glycolic acid.

The solution comprising the cellulose acetate and degradable polymer will also be referred to in the following specification as the “degradable composition”.

The term “degradable polymer” is used herein to refer to a polymeric compound that is chemically broken down through hydrolysis into smaller compounds in the presence of water molecules which may be present in the form of liquid water or water vapour. The hydrolysis of the polymer will typically be slower in the presence of water vapour than in the presence of liquid water. In the filters of the present invention, the chemical breakdown of the degradable polymer in the presence of water brings about a breakdown in the physical structure of the degradable composition. This in turn causes the filter component formed of the degradable composition to break apart so that the remainder of the filtration material in the filter can degrade more quickly due to the increase in the surface area exposed to the environment. Advantageously, filters in accordance with the present invention therefore expedite the degradation of the filter of a smoked article by providing a degradable filter component which will be broken down upon contact with water naturally present in the environment, so as to expose the remainder of the filtration material to the environment.

The degradable polymer of the composition used for forming a component of filters according to the invention is soluble in acetone. This advantageously enables the degradable polymer to be incorporated into a standard manufacturing process for a cellulose acetate filter component, as described in more detail below, without the need for the process to be modified. The degradable polymer can therefore be incorporated into the filter component without incurring additional processing costs and without adversely affecting the output of the process.

For the purposes of the invention, a polymer is considered to be soluble in acetone if at least 33 milligrams (mg) of the polymer dissolves per millilitre (ml) of acetone, at room temperature (22ºC).

Preferred degradable polymers for use in the present invention include but are not limited to polylactic-co-glycolic acid (PLGA), poly(propylene succinate), L-lactide/caprolactone copolymer, polycaprolactone and combinations thereof. Preferably, the degradable polymer is a co-polymer.

Preferably, the degradable polymer is biodegradable.

Preferably, the degradable polymer is substantially insoluble in water. Advantageously, the filter component formed of the degradable composition will not therefore dissolve upon

exposure to water brought into contact with the filter during smoking, for example, from the consumer's mouth or from the mainstream smoke drawn through the filter.

According to the invention as defined above, the degradable polymer is polylactic-co-glycolic acid (PLGA). PLGA is a co-polymer formed of glycolic acid and lactic acid

CLAIMS

1. A filter for a smoking article, the filter including a filter component formed from a solution of cellulose acetate and a degradable polymer in acetone, the degradable polymer being soluble in acetone and degrading in the presence of water, wherein the degradable polymer is polylactic-co-glycolic acid.

2. A filter according to any preceding claim wherein the filter component is a segment of fibrous filtration material comprising a plurality of fibres formed of the solution comprising cellulose acetate and the degradable polymer.

3. A filter according to claim 1 or 2 wherein the composition forming the fibres comprises between 10 percent and 75 percent by weight of the degradable polymer, based on total dry weight.

4. A filter according to claim 2 or 3 wherein the fibrous filter segment further comprises at least one plasticiser applied to the plurality of fibres.

5. A filter according to claim 4 wherein the plasticiser is selected from the group consisting of triacetin, triethyl citrate and polyethylene glycol.

6. A filter according to any of claims 2 to 5 comprising a plurality of spun fibres of the solution comprising cellulose acetate and the degradable polymer.

7. A filter according to claim 6 wherein the fibres are formed by dry solvent spinning.

8. A filter according to any of claims 2 to 7 further comprising at least one of a rod end segment upstream of the fibrous filter segment and a mouth end segment downstream of the fibrous filter segment.

9. A filter according to claim 1 wherein the filter component is a wrapper formed of the solution comprising cellulose acetate tow and the degradable polymer, the wrapper circumscribing at least a portion of the filter.

10. A filter according to claim 9 wherein the composition forming the wrapper comprises between 10 percent and 50 percent by weight of the degradable polymer, based on total dry weight.

11. A filter according to claim 9 or 10 wherein the wrapper is substantially transparent.

12. A filter according to claim 11 wherein the substantially transparent wrapper is a plug wrap and wherein the filter further comprises an outer wrapper overlying the plug wrap, the outer wrapper including a cut-out.

13. A smoking article comprising:

an aerosol-forming substrate; and

a mouthpiece secured in axial alignment with the aerosol-forming substrate, the mouthpiece comprising a filter according to any preceding claim.

14. A smoking article according to claim 13 comprising a tobacco rod attached to the filter.