articles that meets some or all of the above requirements.

It would further be desirable to provide a composite heat source capable of catalysing the decomposition of one or more potentially undesirable gases produced during combustion thereof.

It would also be desirable to provide a composite heat source capable of retaining particulate matter produced during combustion thereof.

According to the present invention there is provided a composite heat source, for example a composite heat source suitable for use in a smoking article, the composite heat source comprising: a porous non-combustible ceramic matrix; and a particulate, combustible fuel completely embedded within the non-combustible porous ceramic matrix, wherein the non-combustible porous ceramic matrix is formed from one or more particulate materials having a median D50 particle size at least five times less than the median D50 particle size of the particulate combustible fuel and wherein the volume fraction of the combustible fuel embedded in the non-combustible porous ceramic matrix is less than or equal to ~~about~~ 50% of the composite heat source.

As used herein, the term 'composite heat source' (singular or plural) is used to denote a heat source comprising at least two distinct components that in combination produce properties not present in the at least two components individually. As described further below, the functions of composite heat sources according to the present invention are advantageously divided between the non-combustible porous ceramic matrix and the combustible fuel embedded within the non-combustible porous ceramic matrix.

As used herein, the term 'ceramic' is used to denote any non-metallic solid which remains solid when heated.

As used herein, the term 'completely embedded' is used to denote that the particles of combustible fuel are completely surrounded by the non-combustible porous ceramic matrix. That is, there is substantially no contact between particles of combustible fuel embedded within the non-combustible porous ceramic matrix.

As used herein, the term 'median D50 particle size" is used to denote the volume-basis median value of the particle size distribution and is the value of the particle diameter at 50% in the cumulative distribution.

Preferably, the non-combustible porous ceramic matrix is formed from one or more particulate materials having a median D50 particle size at least ten times less than the median D50 particle size of the particulate combustible fuel.

The strength of composite heat sources according to the invention is predominantly controlled by the non-combustible porous ceramic matrix. Decoupling of the strength of composite heat sources according to the present invention from the combustible fuel embedded within the non-combustible porous ceramic matrix is advantageous, as the combustible fuel undergoes large changes during combustion making it difficult to control its mechanical behaviour.

CLAIMS:

1. A composite heat source ~~(6)~~ for a smoking article comprising:

a non-combustible porous ceramic matrix ~~(16)~~; and

a particulate combustible fuel ~~(18)~~ embedded within the non-combustible porous ceramic matrix ~~(16)~~,

wherein the non-combustible porous ceramic matrix is formed from one or more particulate materials having a median D50 particle size at least five times less than the median D50 particle size of the particulate combustible fuel and wherein the volume fraction of the combustible fuel ~~(18)~~ embedded in the non-combustible porous ceramic matrix ~~(16)~~ is less than or equal to ~~about~~ 50% of the composite heat source ~~(6)~~.

2. A composite heat source ~~(6)~~ according to claim 1 wherein the non-combustible porous ceramic matrix ~~(16)~~ comprises one or more oxides.

3. A composite heat source ~~(6)~~ according to claim 2 wherein the non-combustible porous ceramic matrix ~~(16)~~ comprises one or more transition metal oxides.

4. A composite heat source ~~(6)~~ according to claim 2 or 3 wherein the non-combustible porous ceramic matrix ~~(16)~~ comprises one or more oxides selected from the group consisting of: iron oxide; manganese oxide; zirconia; quartz; and amorphous silica.

5. A composite heat source ~~(6)~~ according to claim 1, 2 or 3 wherein the non-combustible porous ceramic matrix ~~(16)~~ has pores with diameters of between ~~about~~ 0.01 µm and ~~about~~ 10 µm.

6. A composite heat source according to any of claims 1 to 5 wherein the non-combustible porous ceramic matrix ~~(16)~~ has a thermal diffusivity of less than or equal to ~~about~~ 1 x 10^{-6} m^2/s.

7. A composite heat source ~~(6)~~ according to any of claims 1 to 6 wherein the combustible fuel ~~(18)~~ has an oxidation enthalpy of greater than or equal to ~~about~~ 40 x 10^9 J/m^3.

8. A composite heat source ~~(6)~~ according to any preceding claim wherein the combustible fuel ~~(18)~~ comprises carbon, aluminium, magnesium, one or more metal carbides, one or more metal nitrides or a combination thereof.

9. A composite heat source (6) according to any preceding claim further comprising at least one catalyst for the decomposition of a gas produced by combustion of the fuel.

10. A composite heat source (6) according to claim 9 wherein the at least one catalyst is embedded within the non-combustible porous ceramic matrix (16).

11. A composite heat source (6) according to any preceding claim further comprising one or more oxidants.

12. A composite heat source (6) according to claim 11 wherein the one or more oxidants are selected from the group consisting of: nitrates; chlorates; perchlorates; and permanganates.

13. A composite heat source (6) according to any preceding claim further comprising at least one airflow passageway (22).

14. A smoking article comprising:

a composite heat source (6) according to any preceding claim; and

an aerosol-generating substrate (8).