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.

pore channels of the non-combustible porous ceramic matrix by capillary forces, thereby changing the reactivity of the non-combustible porous ceramic matrix and the cross section of the pore channels.

Preferably, the combustible fuel embedded within the porous ceramic matrix has an oxidation enthalpy of greater than or equal to 40 x 10^9 joules per cubic metre (J/m^3) as measured by dynamic scanning calorimetry (DSC).

Suitable combustible fuels for use in composite heat sources according to the present invention include, but are not limited to, carbon (such as, for example, charcoal (including hardwood charcoal powder) or carbon black), low atomic weight metals (such as, for example, aluminium or magnesium), carbides (such as, for example, aluminium carbide (Al_4C_3) and calcium carbide (CaC_2)), nitrides and mixtures thereof. Combustible fuels suitable for use in composite heat sources according to the present invention are commercially available.

Preferably, the volume fraction of the combustible fuel embedded in the non-combustible porous ceramic matrix is greater than or equal to about 20% of the composite heat source.

~~Preferably, 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.~~

Preferred combustible fuels for use in composite heat sources according to the present invention essentially consist of one or more carbon compounds.

The ignitability of composite heat sources according to the present invention is controlled by the particle size and surface activity of the combustible fuel. Typically, particulate combustible fuels having small particle sizes are easier to ignite. However, it is more difficult to incorporate a high volume fraction of particulate combustible fuels having small particle sizes within the non-combustible porous ceramic matrix. To address this challenge, composite heat sources according to the present invention may comprise mixtures of particulate combustible fuels having particles of different size.

Where composite heat sources according to the present invention comprise two or more particulate combustible fuels having different median D50 particle sizes, 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 present in the greatest amount by weight.

Preferably, composite heat sources according to the present invention comprise one or more particulate combustible fuels having a particle size of between about 1 micron (μm) and about 200 microns (μm).

The combustible fuel may comprise one or more additives for reducing the ignition temperature of the combustible fuel.

Alternatively or in addition, the combustible fuel may comprise one or more additives for reducing the emission of potentially undesirable gases from the combustible fuel during