POROUS METAL MEMBRANE OF SINTERED POWDERS AND METAL FIBERS

RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 61/439,581, filed on February 4, 2011. The entire teachings of the above application are incorporated herein by reference.

BACKGROUND OF THE INVENTION

The performance of gas filtration media made of metal is largely dependent on the raw materials used. Particle removal efficiency in gases is a function of the total internal surface area of the material. Therefore, materials best suited are those which have large surface area to volume ratios. Smaller, irregular shaped metal particles or fibers are best suited for making gas filtration media. Current high efficiency all metal gas filters are generally of 2 categories. The first are those made from fine metal powders, generally less than 20 microns and often 1 micron to 3 microns. An example is the Entegris "Wafergard® III" line of gas filters or the Mott "Gas Shield®" line of filters. The second are filters made from small diameter metal fibers- fibers with diameters of 5 micron or less. Examples of this are the Pall "Gaskleen®" line of filters and Mott "Defender" filters.

Generally speaking, the filters made from powders have a lower permeability than those made from fibers due to the powder metallurgy process employed to make them. It is difficult to fabricate a solid state porous matrix of low enough density to ensure high permeability using powders. On the other hand, solid state materials from fibers can be fabricated using non-woven techniques producing very low density materials with high permeability. The porous materials made from powder metals tend to be stronger structures and the porous materials made from fiberous material tend to have a relatively weaker structure.

In general, high efficiency gas filtration material which employ powders are made using tradition powder metal processes: a powder is poured into a mold, the mold is compressed to form a coherent, yet fragile, "green form" and this green form is sintered to from solid bonds between the discreet metal particles. This process is simple, straight forward and widely practiced.

POROUS METAL BODY OF SINTERED POWDERS AND METAL FIBERS

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