

## **FILTRATION SYSTEM**

### **PRIORITY UNDER 35 U.S.C Section 119(e) & 37 C.F.R. Section 1.78**

[001] This nonprovisional application claims priority based upon the following prior United States Provisional Patent Application entitled: Filtration device, Facial Mask, Eye Mask and/or protective clothing with or without filtrations device and method, Application No.: 62/706,678 filed Spetember 2, 2020, in the name of Christina Rahm Cook, which is hereby incorporated by reference for all purposes.

### **FIELD OF THE INVENTION**

[002] The present invention relates generally to filtration apparatus and apparel, more specifically but not by way of limitation, a filtration system comprised of elements such as but not limited to facial masks and articles of clothing wherein the filtration system of the present invention incorporates utilization of sodium aluminosilicate compounds in order to achieve an improved filtration for users of the present invention.

**BACKGROUND**

[003] The recent global viral pandemic has placed a greater sense of awareness on air quality and its impact on human lives. While respiratory pathogens are a concern, other factors such as but not limited to environmental, and animal toxins and pathogens are increasingly prevalent. These include but are not limited to nuclear waste, viruses, bacteria, fungi, and parasites. Masks and protective clothing are designed to provide certain types of protection for the wearers thereof. Some of these types of personal protective equipment may require additional elements to provide improved barriers and filtration, which may offer enhanced protection from environmental exposure to such toxins and pathogens. Reduced exposure to the aforementioned will lead to a reduction in the illnesses they may cause, and may further provide prevention of transmission of such toxins and pathogens amongst people and in the environment. Currently, there are existing technologies for articles such as but not limited to clothing and facial mask and personal protective equipment used for protection. Conventional masks and personal protective equipment have various compositions, ranging that include but are not limited to three-layer masks, 4 and 5 layer N95 masks, as well as KN95 masks and/or protective clothing. Additional examples of masks or personal protective equipment include mask and/or personal protective equipment with respirators, mask and/or personal protective equipment that are medical and non-medical.

[004] These conventional masks and personal protective equipment do not provide adequate detoxifying elements or adequate barriers to many airborne toxins and pathogens. Furthermore, conventional masks can cause issues in animals or humans that have breathing problems. Existing mask technology and personal protective equipment lack appropriate standards of detoxification and are also rarely customized for special applications such as but not limited to animal use. The current personal protective equipment and mask available require additional items to provide additional barricades

to inhibit a user from being exposed to toxins and pathogens that are detrimental to their health.

[005] Accordingly, there is a need for a filtration system that is embodied in elements such as but not limited to masks and apparel wherein the filtration system of the present invention is operable to provide more effective filtration of air for a user of the present invention.

### **SUMMARY OF THE INVENTION**

[006] It is the object of the present invention to provide a filtration system operable to provide improved filtration of air for a user wherein the present invention includes various forms of a sodium aluminosilicate compounds that are integrated into alternate embodiments such as but not limited to masks and fabrics.

[007] Another object of the present invention is to provide a personal air filtration system configured to trap toxins, pathogens and similar material so as to inhibit being inhaled by a user wherein the present invention incorporates employment of nanoparticles of sodium aluminosilicate compounds.

[008] A further object of the present invention is to provide a filtration system operable to provide improved filtration of air for a user wherein the present invention employs materials impregnated with sodium aluminosilicate compounds so as to be capable of self-activation to destroy various pathogens such as but not limited to viruses, bacteria, fungus, and parasites.

[009] Still another object of the present invention is to provide a personal air filtration system configured to trap toxins, pathogens and similar material so as to inhibit being inhaled by a user wherein the present invention in some embodiments includes a filter having a sodium aluminosilicate

compound therein that is capable of detoxifying and inhibiting transmission of toxins such as but viruses bacteria, fungus, and parasites.

[0010] An additional object of the present invention is to provide a filtration system operable to provide improved filtration of air for a user wherein a sodium aluminosilicate compound is infused into layers of fabric of which the present invention is manufactured and further can be incorporated into interior and exterior portions of embodiments of the present invention.

[0011] Yet a further object of the present invention is to provide a personal air filtration system configured to trap toxins, pathogens and similar material so as to inhibit being inhaled by a user wherein the present invention utilizes sodium aluminosilicate compounds that are incorporated into alternate types of masks such as but not limited to N-95, KN-95, three-layer, four layer masks and five layer masks. Furthermore this can include may be a surgical and non-medical embodiments, which may or may not include a respirator.

[0012] Another object of the present invention is to provide a filtration system operable to provide improved filtration of air for a user that provides sodium aluminosilicate compounds providing air filtration compound that is incorporated into the layers of an embodiment of the present invention or is incorporated into a sodium aluminosilicate filtration device operably coupled with an article of the present invention.

[0013] To the accomplishment of the above and related objects the present invention may be embodied in the form illustrated in the accompanying drawings. Attention is called to the fact that the drawings are illustrative only. Variations are contemplated as being a part of the present invention, limited only by the scope of the claims.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

[0014] A more complete understanding of the present invention may be had by reference to the following Detailed Description and appended claims when taken in conjunction with the accompanying Drawings wherein:

[0015] Figure 1 is a perspective view of an embodiment of the present invention; and

[0016] Figure 2 is a perspective view of an alternate embodiment of the present invention; and

[0017] Figure 3 is a perspective view of an alternate embodiment of the present invention; and

[0018] Figure 4 is a cross-sectional diagram of exemplary filtration construction of the present invention.

**DETAILED DESCRIPTION**

[0019] Referring now to the drawings submitted herewith, wherein various elements depicted therein are not necessarily drawn to scale and wherein through the views and figures like elements are referenced with identical reference numerals, there is illustrated a filtration system 100 constructed according to the principles of the present invention.

[0020] An embodiment of the present invention is discussed herein with reference to the figures submitted herewith. Those skilled in the art will understand that the detailed description herein with respect to these figures is for explanatory purposes and that it is contemplated within the scope of the present invention that alternative embodiments are plausible. By way of example but not by way of limitation, those having skill in the art in light of the present teachings of the present invention will recognize a plurality of alternate and suitable approaches dependent upon the needs of the particular application to implement the functionality of any given detail described herein, beyond that of the particular implementation choices in the embodiment described herein. Various modifications and embodiments are within the scope of the present invention.

[0021] It is to be further understood that the present invention is not limited to the particular methodology, materials, uses and applications described herein, as these may vary. Furthermore, it is also to be understood that the terminology used herein is used for the purpose of describing particular embodiments only, and is not intended to limit the scope of the present invention. It must be noted that as used herein and in the claims, the singular forms "a", "an" and "the" include the plural reference unless the context clearly dictates otherwise. Thus, for example, a reference to "an element" is a reference to one or more elements and includes equivalents thereof known to those skilled in the art. All conjunctions used are to be understood in the most inclusive sense possible. Thus, the word "or" should be understood as having the definition of a logical "or" rather than that of a logical "exclusive

or” unless the context clearly necessitates otherwise. Structures described herein are to be understood also to refer to functional equivalents of such structures. Language that may be construed to express approximation should be so understood unless the context clearly dictates otherwise.

[0022] References to “one embodiment”, “an embodiment”, “exemplary embodiments”, and the like may indicate that the embodiment(s) of the invention so described may include a particular feature, structure or characteristic, but not every embodiment necessarily includes the particular feature, structure or characteristic.

[0023] Referring in particular to the Figures submitted as a part hereof, the filtration system 100 is provided in multiple embodiments wherein it should be understood within the scope of the present invention that the exemplary embodiments illustrated herein do not function to limit the embodiment types of the present invention. It should be understood within the scope of the present invention that the filtration system 100 can be embodied in alternate articles such as but not limited to various fabrics operable to be constructed into articles of clothing. The embodiment of the filtration system 100 illustrated in Figure 1 herein is an exemplary facemask 10 of the present invention. the facemask 10 includes an outer shell 11 being manufactured of a plurality of layers that will be further discussed herein in reference to Figure 4 submitted as a part hereof. The outer shell 11 includes perimeter edge 12 and is formed to sealably fit onto a wearer’s face. The outer shell includes nose bridge 16 wherein the nose bridge 16 is manufactured of pliable metal so as to be mateably formed to a wearers’ nose. The facemask 10 is secured to the wearer utilizing mounting straps 14,15.

[0024] As illustrated herein in Figure 4, the filtration system 100 includes a multiple layer material 20. The material 20 of the filtration system 100 is employed in various embodiments of the filtration system 100 such as but not limited to the facemask 10. The material 20 includes a plurality of layers 21 wherein each of the layers 21 are operable to provide filtration of air passing therethrough. The material 20 includes a primary layer 25 wherein

the primary layer 25 includes sodium aluminosilicate compounds. Sodium aluminosilicate refers to compounds which sodium, aluminum, silicon and oxygen. In a preferred embodiment of the present invention that primary layer would include a sodium aluminosilicate compound selected from the following:  $\text{Na}_{12}\text{Al}_{12}\text{Si}_{12}\text{O}_{48}\cdot 27\text{H}_2\text{O}$  (zeolite A);  $\text{Na}_{16}\text{Al}_{16}\text{Si}_{32}\text{O}_{96}\cdot 16\text{H}_2\text{O}$  (Analcime) or  $\text{Na}_{12}\text{Al}_{12}\text{Si}_{12}\text{O}_{48}\cdot q \text{H}_2\text{O}$  (Losod). It should be understood within the scope of the present invention that the aforementioned compounds are exemplary only and alternate compounds could be utilized. The material 20 while illustrated herein as having four layers could employ more or less than four layers. The layers 21 can be manufactured from substances such as but not limited to N95 filtration, cotton, polyester or other similar materials. The primary layer 25 is comprised of a suitable substrate and is impregnated with a sodium aluminosilicate compound. It is contemplated within the scope of the present invention that the primary layer 25 could be impregnated with sodium aluminosilicate compounds utilizing alternate suitable techniques. In a preferred embodiment of the present invention the sodium aluminosilicate compounds are formed in nanoparticles wherein the nanoparticles are impregnated into the primary layer 25.

[0025] Referring now to Figure 2, an alternate embodiment of the filtration system 100 is illustrated therein. The mask 30 includes outer shell 31 wherein outer shell 31 is manufactured from a suitable material such as but not limited to nylon. Mounted to the outer shell 31 is the filtration compartment 35. The filtration compartment 35 includes an interior volume wherein the interior volume has disposed therein a sodium aluminosilicate compound. Air passes through the vents 37 of the filtration compartment 35 and subsequently passes through the sodium aluminosilicate compound disposed within the interior volume of the filtration compartment 35. The sodium aluminosilicate compounds disposed within the filtration compartment 35 can vary and some examples have been previously listed herein above. It should be understood within the scope of the present



invention that the filtration compartment 35 provides filtration of both inhalation and exhalation of a wearer.

[0026] Now referring to Figure 3 submitted herewith, an alternate embodiment of the filtration system 100 is illustrated therein. The filtration mask 40 includes shell 41 wherein the shell is manufactured from a suitable material such as but not limited to nylon. The shell 41 has secured thereto an air intake 42. Air intake 42 is secured to shell 41 utilizing suitable durable techniques. Air intake 42 is operably coupled to tube 43 wherein the tube 42 is hollow and connected to first filtration compartment 45. A second tube 49 operably couples the first filtration compartment 45 to the second filtration compartment 46. The interior volumes of the first filtration compartment 45 and second filtration compartment 46 have disposed therein a sodium aluminosilicate compound that function to provide filtration of air passing therethrough. It should be understood that the sodium aluminosilicate compounds could vary and exemplary compounds have been listed herein. The mask 40 is an exemplary embodiment of the present invention and it should be understood within the scope of the present invention that various alternate configurations could be employed.

[0027] In the preceding detailed description, reference has been made to the accompanying drawings that form a part hereof, and in which are shown by way of illustration specific embodiments in which the invention may be practiced. These embodiments, and certain variants thereof, have been described in sufficient detail to enable those skilled in the art to practice the invention. It is to be understood that other suitable embodiments may be utilized and that logical changes may be made without departing from the spirit or scope of the invention. The description may omit certain information known to those skilled in the art. The preceding detailed description is, therefore, not intended to be limited to the specific forms set forth herein, but on the contrary, it is intended to cover such alternatives, modifications, and equivalents, as can be reasonably included within the spirit and scope of the appended claims.

**ABSTRACT OF THE DISCLOSURE**

An air filtration system including a plurality of embodiments wherein the embodiments can include but are not limited to facemasks and clothing that have at least one layer of material impregnated with sodium aluminosilicate compounds or have an element thereof having the sodium aluminosilicate compounds disposed therein. The present invention deploys sodium aluminosilicate compounds, preferably in nanoparticles, to provide filtration of air so as to remove matter such as but not limited to toxins, pathogens and similar material. In one embodiment of the present invention a facemask is constructed having a primary layer of material is employed wherein the primary layer is impregnated with sodium aluminosilicate compounds. Alternate embodiments of the present invention include compartments or similar elements that have sodium aluminosilicate compounds disposed therein. The compartments are filled with sodium aluminosilicate compounds and are operable to filter air passing therethrough.