CLAIMS

What is claimed is:

[Claim 1] An active-field/polarized-media air cleaner comprising:

a first conductive outer screen;

a second conductive screen substantially parallel to the first conductive outer screen;

a filter media disposed between the first conductive outer screen and the second conductive screen, the filter media comprising a scrimless media layer or layers, and

two support layers with the scrimless media layer or layers sandwiched therebetween; and

a high-voltage power supply having first and second terminals, the first terminal of the high-voltage power supply being connected to the first conductive outer screen and the second terminal of the high-voltage power supply being coupled to the second conductive screen.

[Claim 2] The active-field/polarized-media air cleaner of claim 1, wherein the filter media comprises a triboelectric material.

[Claim 3] The active-field/polarized-media air cleaner of claim 2, wherein the triboelectric material is an aramid.

[Claim 4] The active-field/polarized-media air cleaner of claim 2, wherein the filter media includes polypropylene fibers with polymethaphenylene isophtalamide fibers.

[Claim 5] The active-field/polarized-media air cleaner of claim 4, wherein the filter media includes a layer of material with a weight ratio of polymethaphenylene isophtalamide fibers to polypropylene fibers ranging between 5:95 and 50:50,

[Claim 6] The active-field/polarized-media air cleaner of claim 4, wherein the filter media includes a layer of material with a weight ratio of polymethaphenylene isophtalamide fibers to polypropylene fibers ranging between 10:90 and 30:70.

[Claim 7] The active-field/polarized-media air cleaner of claim 1, wherein one of the support layers is a top layer, and the other of the support layers is a bottom layer, wherein the top layer faces the direction of airflow.

[Claim 8] The active-field/polarized-media air cleaner of claim 7, wherein the scrimless media layer comprises mod-acrylic fibers.

[Claim 9] The active-field/polarized-media air cleaner of claim 7, wherein the scrimless media layer comprises polypropylene blend fibers.

[Claim 10] The active-field/polarized-media air cleaner of claim 7, wherein the top support layer is a nonwoven material.

[Claim 11] The active-field/polarized-media air cleaner of claim 10, wherein the nonwoven material is selected from a group consisting of polyester, glass, and wool.

[Claim 12] The active-field/polarized-media air cleaner of claim 7, wherein the bottom support layer is selected from a group consisting of a nonwoven material, plastic netting, vinyl, and a non-conductive screen.

[Claim 13] The active-field/polarized-media air cleaner of claim l, further comprising a UV light source, wherein the filter media is subject to UV light of the light source.

[Claim 14] The active-field/polarized-media air cleaner of claim 1, further comprising a second conductive outer screen upstream from the second conductive screen and an additional triboelectric filter layer with materials from two sides of a triboelectric scale between the second conductive outer screen and the second conductive screen.

[Claim 15] The active-field/polarized-media air cleaner of claim 14, wherein a first conductive outer screen, second conductive screen, second conductive outer screen, and scrimless filter media are all contained within a module.

[Claim 16] The active-field/polarized-media air cleaner of claim 15, wherein the module has a hinge to access the scrimless filter media.

[Claim 17] The active-field/polarized-media air cleaner of claim 15, wherein the module is a self-contained cartridge.

[Claim 18] An active-field/polarized-media air cleaner comprising:

a first conductive outer screen;

a second conductive screen substantially parallel to the first conductive outer screen;

an aramid triboelectric filter media disposed between said first conductive outer screen and the second conductive screen, the aramid triboelectric filter media comprising a scrimless media layer or layers comprising an aramid triboelectric material, and two support layers with the scrimless media layer or layers sandwiched therebetween; and

a high-voltage power supply having first and second terminals, the first terminal of the high-voltage power supply being connected to the second conductive screen, the second terminal of the high-voltage power supply being coupled to the first conductive outer screen.