CLAIMS

What is Claimed Is:

1. A tumor treating fields (TTFields) apparatus for applying an alternating electric field to a living subject or an in vitro medium , the apparatus comprising:

a layer of conductive material having a front face, the front face having an area;

a flexible polymer layer positioned against the front face of the conductive material so as to cover at least a portion of the area, the polymer layer having a front face; and

an electrical lead positioned in electrical contact with the layer of conductive material,

wherein the polymer layer comprises at least one polymer selected from Poly(VDF-TrFE-CTFE), Poly(VDF-TrFE-CFE), and Poly(VDF-TrFE-CFE-CTFE); and

wherein the TTFields application apparatus is adapted to supply an alternating electric field to the living subject or the *in vitro* medium at a frequency between 100 kHz and 500 kHz.

2. The apparatus of claim 1, further comprising a flexible third layer positioned behind the layer of conductive material, the flexible third layer having a front face,

wherein at least a portion of the front face of the third layer is coated with an adhesive,

wherein a first region of the adhesive is positioned directly behind the layer of conductive material and supports the layer of conductive material, and

wherein a second region of the adhesive is positioned outwardly with respect to the first region and is configured to (a) when pressed against a region of skin, adhere to the skin and hold the polymer layer adjacent to the skin, and (b) be easily removable from the skin.

3. The apparatus of claim 2, further comprising a layer of conductive hydrogel disposed on the front face of the polymer layer, wherein the layer of conductive hydrogel is positioned to make contact with the skin when the polymer layer is being held adjacent to the skin by the second region of the adhesive.

4. The apparatus of claim 1, wherein the polymer layer has a thickness of 20 μm or less.

5. The apparatus of claim 1, wherein the polymer layer has a thickness of 10 μm or less.

6. The apparatus of claim 1, wherein the polymer layer has a thickness of 5 μm or less.

7. The apparatus of claim 1, wherein the polymer comprises 30 mol% to 80 mol% VDF and 5 mol% to 60 mol% TrFE, with CFE and/or CTFE constituting the balance of the mol%.

8. The apparatus of claim 1, wherein the polymer layer comprises ceramic nanoparticles mixed into at least one of Poly(VDF-TrFE-CTFE), Poly(VDF-TrFE-CFE), and Poly(VDF-TrFE-CFE-CTFE).

9. The apparatus of claim 8, wherein the ceramic nanoparticles comprise at least one of barium titanate and barium strontium titanate.

10. The apparatus of claim 1, wherein the polymer layer comprises a plurality of flexible polymer regions.

11. The apparatus of claim 10, wherein the plurality of polymer regions is printed, sprayed, or cast directly onto the plurality of conductive pads.

12. The apparatus of claim 10, wherein each of the polymer regions independently has a thickness of 10 μm or less.

13. The apparatus of claim 10, wherein the layer of conductive material comprises a plurality of conductive pads and wherein the areas of the plurality of conductive pads collectively add up to at least 25 cm^2.

14. The apparatus of claim 1, wherein the polymer comprises 30 mol% to 80 mol% VDF and 5 mol% to 60 mol% TrFE, with CFE and/or CTFE constituting the balance of the mol%, and wherein the polymer layer has a thickness of 10 μm or less.