CLAIMS

1. A very high capacitance film capacitor which includes a dielectric layer consisting of at least one dielectric film, each dielectric film of this dielectric layer having the following parameters:

- a relative dielectric permittivity [ε_f^i] such that $\varepsilon_f^i \geq 10$,
- a thickness [e_f^i] such that $0.05\ \mu m \leq e_f^i \leq 50\ \mu m$,
- a dielectric strength [E_f^i] such that $E_f^i \geq 50\ V/\mu m$,

parameters in which "f" means "film" and $i \geq 1$, "i" designating the "i^{th}" dielectric film of said dielectric layer,

this dielectric layer separating a first electronic charge-bearing structure from a second electronic charge-bearing structure, these two structures having an opposite surface separated by the dielectric layer,

characterized by the fact that:

A/ the interface between the dielectric layer and the first structure meets the following requirements:

- the portion of the opposite surface where said first structure is directly in contact with said dielectric layer is greater than 90%,
- in all the areas of the interface where the dielectric layer is not directly in contact with said first structure, they are separated locally by N (with $N \geq 1$) thicknesses of "parasitic" dielectrics", each thickness having a relative dielectric permittivity [ε_p^j] and a dielectric strength [E_p^j] which satisfy the relation:

$$\varepsilon_p^j \, E_p^j \geq \text{Min} \, (\varepsilon_f^i \, E_f^i)$$

where "p" means "thickness of parasitic dielectrics" and "j" refers to the "j^{th}" thickness, with $1 \leq j \leq N$,

B/ the interface between the dielectric layer and the second structure meets the following requirements:

- the portion of the opposite surface where said second structure is directly in contact with said dielectric layer is greater than 90%,
- in all the areas of the interface where the dielectric layer is not directly in contact with said second structure, they are locally separated by M (with $M \geq 1$) thicknesses of "parasitic" dielectrics", each thickness having a relative dielectric permittivity [ε_p^k] and a dielectric strength [E_p^k] which satisfy the relation:

$$\varepsilon_p^k \, E_p^k \geq \text{Min} \, (\varepsilon_f^i \, E_f^i)$$

where "p" means "thickness of parasitic dielectrics" and "k" refers to the "k^{th}" thickness, with $1 \leq k \leq M$,

with the following additional condition:

C/ when said dielectric layer consists of more than one dielectric film, then any interface Σ between two dielectric films satisfies the following conditions:

- the portion of the opposite surface where the two dielectric films are directly in contact is greater than 90%,
- in all the areas of the interface Σ where the two dielectric films are not directly in contact, these films are locally separated by P_Σ (with $P_\Sigma \geq 1$) thicknesses of "parasitic" dielectrics, each thickness

having a relative dielectric permittivity [ε_p^{ℓ}] and a dielectric strength [E_p^{ℓ}] which satisfy the relation:

$$\varepsilon_p^{\ell} \, E_p^{\ell} \geq \text{Min} \, (\varepsilon_f^{i} \, E_f^{i})$$

where "p" means "thickness of parasitic dielectrics" and "ℓ" refers to the "ℓ^{th}" thickness, with $1 \leq \ell \leq P_{\Sigma}$, said dielectric layer being made of polymer material or based on polymer material, excluding an exclusively mineral material.

2. The film capacitor according to claim 1, characterized by the fact that said dielectric layer is not self-supporting.

3. A method for manufacturing a film capacitor according to claim 2, characterized by the fact that it has the following successive steps:

a) using a second dielectric layer called "support layer", of relative dielectric permittivity [ε_f'] and of thickness [e_f'], which is metallized on at least one of its two opposite sides, and of dielectric strength [E_f'];

b) depositing said dielectric layer on said support layer so that it is in contact with a metallized side of this support layer;

c) proceeding to the metallization of the side of said dielectric layer which remained free at the end of step b);

d) proceeding to the coiling on itself of the set resulting from step c) or to the stacking of several sets resulting from step c);

said dielectric layer and support layer satisfying the following relation:

$e_f' \, E_f' \geq e_f \, E_f$, wherein the expressions e_f and E_f are defined in claim 1.

4. The method according to claim 3, characterized by the fact that it uses a support film which is metallized on its both sides, and that in step d), the metallized surface of said dielectric layer is matched, that is to say mirrored, with that of one of the sides of said support layer.

5. The method according to claim 3, characterized by the fact that a metallized support film on one of its sides is used and that in step d), the metallized surface of said dielectric layer is matched, that is to say mirrored, with that of said support layer.

6. The method according to claim 5, characterized by the fact that a support layer whose relative electric permittivity [ε_f'] is less than or equal to 10, is used.

7. The method according to any of claims 3 to 6, characterized by the fact that the implementation of step d) is carried out by operating under vacuum or at a pressure less than or equal to 10 mbar.

8. The method according to any of claims 3 to 7, characterized by the fact that in step d), a plating of a new set on the previous one is carried out by applying a pressure, especially via a pressure roller, or by controlling the tension angle.

9. The method according to claim 3, characterized by the fact that it has the following steps:

a) depositing said dielectric layer on a support film consisting of a metal strip;

b) depositing the set resulting from step a) on a dielectric support layer;

c) depositing the set resulting from step b) on a second support film consisting of a metal strip;

d) proceeding to the coiling on itself of the set resulting from step c) or to the stacking of several sets resulting from step c).

10. The method according to claim 9, characterized by the fact that said dielectric layers are identical.

11. The method according to claim 9 or 10, characterized by the fact that said support films are identical metal strips.

12. The method according to any of claims 9 to 11, characterized by the fact that, between said steps a) and b), the side of said dielectric layer that has remained free is subjected to a metallization.

13. The method according to claim 12, characterized by the fact that, between said steps b) and c), the side of said dielectric support layer that has remained free is subjected to a metallization.

14. The method according to any of claims 9 to 13, characterized by the fact that the implementation of step d) is carried out by operating under vacuum or at a pressure less than or equal to 10 mbar, is carried out.

15. The method according to any of claims 9 to 14, characterized by the fact that in step d), a plating of a new set on the previous one is carried out by applying a pressure, especially via a pressure roller, or by controlling the tension angle.

16. The method according to any of claims 9 to 15, characterized by the fact that porous strips are used.

17. The method according to any of claims 9 to 16, characterized by the fact that strips which incorporate fuses are used.

18. The method of claim 17, characterized by the fact that the incorporation of said fuses is carried out by using either of the following techniques:

- removal of material from said strip, so that the remaining material constitutes said fuses, which removal is carried out by a technique such as spraying of the metal, punching or mechanical drilling of the metal, dissolution or chemical etching of the metal;

- addition of material to said strip, so that the added material constitutes said fuses, which addition is carried out by a technique such as welding, brazing, clinching or stamping.