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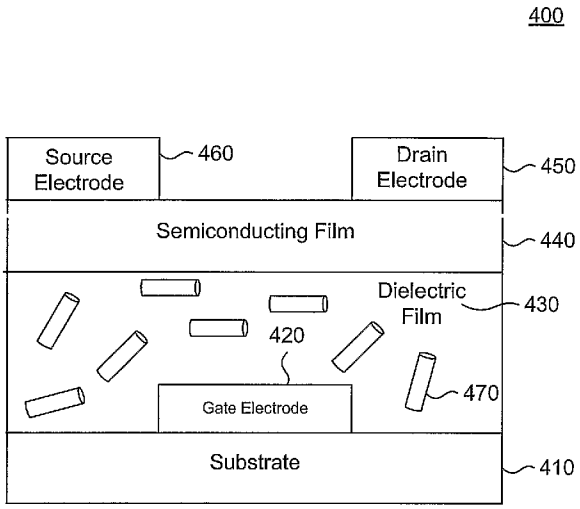
Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

[Continued on next page]

(54) **Title:** ARTIFICIAL DIELECTRICS USING NANOSTRUCTURES



(57) **Abstract:** Artificial dielectrics using nanostructures, such as nanowires, are disclosed. In embodiments, artificial dielectrics using other nanostructures, such as nanorods, nanotubes or nanoribbons and the like are disclosed. The artificial dielectric includes a dielectric material with a plurality of nanowires (or other nanostructures) embedded within the dielectric material. Very high dielectric constants can be achieved with an artificial dielectric using nanostructures. The dielectric constant can be adjusted by varying the length, diameter, carrier density, shape, aspect ration, orientation and density of the nanostructures. Additionally, a controllabe artificial dielectric using nanostructures, such as nanowires, is disclosed in which the dielectric constant can be dynamically adjusted by applying an electric field to the controllable artificial dielectric. A wide range of electronic devices can use artificial dielectrics with nanostructures to improve performance. Example devices include, capacitors thin film transistors, other types of thin film electronic devices, microstrip devices, surface acoustic wave (SAW) filters, other types of filters, and radar attenuating materials (RAM).

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