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(54) Title: SEMICONDUCTOR DEVICE INCLUDING A COUPLED DIELECTRIC LAYER AND METAL LAYER, METHOD OF FABRICATION THEREOF, AND MATERIAL FOR COUPLING A DIELECTRIC LAYER AND A METAL LAYER IN A SEMICONDUCTOR DEVICE

(57) Abstract: A passivating coupling material for, on the one hand, passivating a dielectric layer in a semiconductor device, and on the other hand, for permitting or at least promoting liquid phase metal deposition thereon in a subsequent process step. In a particular example, the dielectric layer may be a porous material having a desirably decreased dielectric constant k, and the passivating coupling material provides steric shielding groups that substantially block the adsorption and uptake of ambient moisture into the porous dielectric layer. The passivating coupling materials also provides metal nucleation sides for promoting the deposition of a metal thereon in liquid phase, in comparison with metal deposition without the presence of the passivating coupling material. The use of a liquid phase metal deposition process facilitates the subsequent manufacture of the semiconductor device. In one example, the passivating coupling material has multiple Si atoms in its chemical composition, which desirably increases the thermal stability of the material.

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