METHOD OF FORMING A HIGH K METALLIC DIELECTRIC LAYER

ABSTRACT

A process for forming a high dielectric constant, (High K), layer, for a metal - oxide - metal, capacitor structure, featuring localized oxidation of an underlying metal layer, performed at a temperature higher than the temperature experienced by surrounding structures, has been developed. A first iteration of this process features the use of a laser ablation procedure, performed to a local region of an underlying metal layer, in an oxidizing ambient. The laser ablation procedure creates the desired, high temperature, only at the laser spot, allowing a high K layer to be created at this temperature, while the surrounding structures on a semiconductor substrate, not directly exposed to the laser ablation procedure remain at lower temperatures. A second iteration features the exposure of specific regions of an underlying metal layer, to a UV, or to an I line exposure procedure, performed in an oxidizing ambient, with the regions of an underlying metal layer exposed to the UV or I line procedure, via clear regions in an overlying photolithographic plate. This procedure also results in the formation of a high K layer, on a top portion of the underlying metal layer.

Figure 3.