ABSTRACT

SELECTIVE DEPOSITION OF SILICON NITRIDE ON SILICON OXIDE USING CATALYTIC CONTROL

Methods and apparatuses for selectively depositing silicon nitride on exposed silicon oxide surfaces of a substrate relative to exposed silicon surfaces are provided herein. Techniques involve providing trimethylaluminum to the substrate to form an aluminum-containing moiety on an exposed silicon oxide surface and selectively depositing silicon nitride on the surface using alternating pulses of an aminosilane and a hydrazine by thermal atomic layer deposition catalyzed by the aluminum-containing moiety on the exposed silicon oxide surface relative to an exposed silicon surface. Additional techniques involve providing a transition metal-containing gas to an exposed silicon oxide surface to form a transition metal-containing moiety that acts as a catalyst during thermal atomic layer deposition of silicon nitride using alternating pulses of an aminosilane and a hydrazine.

Fig. 3