

METHOD AND PRECURSORS FOR MANUFACTURING 3D DEVICES

ABSTRACT OF THE DISCLOSURE

Described herein is an apparatus comprising a plurality of silicon-containing layers wherein the silicon-containing layers are selected from a silicon oxide and a
5 silicon nitride layer or film. Also described herein are methods for forming the apparatus to be used, for example, as 3D vertical NAND flash memory stacks. In one particular aspect of the apparatus, the silicon oxide layer comprises slightly compressive stress and good thermal stability. In this or other aspects of the apparatus, the silicon nitride layer comprises slightly tensile stress and less than 300 MPa stress change after up to
10 about 800°C thermal treatment. In this or other aspects of the apparatus, the silicon nitride layer etches much faster than the silicon oxide layer in hot H₃PO₄, showing good etch selectivity.

15 Fig. 4