SYNTHESIS OF GE NANOCRYSTAL MEMORY CELL AND USING A BLOCK LAYER TO CONTROL OXIDATION KINETICS

Abstract

A structure and a method of manufacturing a memory devices using nanoncrystals. A first embodiment is characterized as follows. We form a first gate insulator over the substrate. The first gate insulator is comprised of an oxide layer and blocking layer. We form a SiGe layer over the first gate insulator layer. Then we perform an oxidation/anneal process consume the SiGe layer to form Ge nanocrystals7 on the first gate insulator layer and a silicon oxide layer over the first gate insulator layer. We form a gate electrode over the a silicon oxide layer. In a second embodiment, the first gate insulator is comprised of one layer of oxidation blocking material. The blocking layer prevents the oxidation of the substrate during process steps used to form the nanocrystals.

Figure 1E