CLAIMS

What is claimed is:

1. A method of fabricating a semiconductor device on a semiconductor substrate comprising a semiconductor material, the method comprising:

forming an isolation region in the semiconductor substrate, the isolation region being recessed relative to a first region of the semiconductor material adjacent to the isolation region, the isolation region comprising a first dielectric material;

forming a first layer of a second dielectric material overlying the isolation region and the first region, the second dielectric material being more resistant to an etchant than the first dielectric material; and

removing the second dielectric material overlying the first region leaving portions of the second dielectric material overlying the isolation region intact.

2. The method of claim 1, wherein forming the isolation region comprises forming an oxide material in a trench adjacent to the first region, the second dielectric material being more resistant to hydrofluoric acid-comprising etchants than the oxide material.

3. The method of claim 1, further comprising forming a second layer of a third dielectric material overlying the isolation region and the first region prior to forming the first layer, the first layer overlying the second layer.

4. The method of claim 3, wherein removing the second dielectric material comprises planarizing the first layer to obtain a planar surface aligned with portions of the second layer overlying the first region.

5. The method of claim 3, wherein:

forming the second layer comprises conformably depositing the third dielectric material overlying the isolation region and the first region; and

forming the first layer comprises conformably depositing the second dielectric material overlying the third dielectric material.

6. The method of claim 5, the isolation region being recessed relative to the first region by a first distance, wherein conformably depositing the second dielectric material comprises depositing the second dielectric material to a first thickness greater than the first distance.

7. The method of claim 6, wherein conformably depositing the third dielectric material comprises depositing the third dielectric material to a second thickness less than the first distance.

8. The method of claim 3, the isolation region being recessed relative to the first region by a first distance, wherein;

forming the second layer comprises forming the second layer having a first thickness less than the first distance; and

forming the first layer comprises forming the first layer having a second thickness greater than the first distance.

9. The method of claim 8, wherein:

forming the second layer comprises conformably depositing an oxide material overlying the isolation region and the first region; and

forming the first layer comprises conformably depositing a nitride material overlying the oxide material.

10. The method of claim 9, wherein removing the second dielectric material comprises polishing the nitride material until the oxide material overlying the first region is exposed.

11. The method of claim 9, wherein removing the second dielectric material comprises removing portions of the nitride material to obtain a planar surface aligned with the oxide material overlying the first region.

12. The method of claim 3, further comprising:

removing the third dielectric material overlying the first region; and

forming a transistor structure on the first region.

13. A method of fabricating a semiconductor device on a semiconductor substrate comprising a semiconductor material, the method comprising:

forming an oxide isolation region adjacent to a first region of the semiconductor material, the oxide isolation region being recessed relative to the first region;

conformably depositing a nitride material overlying the first region and the oxide isolation region; and

removing the nitride material overlying the first region leaving a portion of the nitride material overlying the oxide isolation region intact.

14. The method of claim 13, further comprising conformably depositing an oxide material overlying the first region and the oxide isolation region prior to conformably depositing the nitride material, wherein removing the nitride material comprises polishing the nitride material until the oxide material is exposed.

15. The method of claim 13, further comprising conformably depositing an oxide material overlying the first region and the oxide isolation region prior to conformably depositing the nitride material, wherein removing the nitride material comprises planarizing the nitride material to obtain a planar surface aligned with the oxide material overlying the first region.

16. The method of claim 15, the oxide isolation region being recessed relative to the first region by a first distance, wherein:

conformably depositing the oxide material comprises depositing the oxide material to a first thickness less than the first distance; and

conformably depositing the nitride material comprises depositing the nitride material to a second thickness greater than the first distance.

17. A semiconductor device comprising:

an active region of semiconductor material having a transistor structure formed thereon;

an oxide isolation region adjacent to the active region of semiconductor material, the oxide isolation region being recessed relative to the active region; and

a dielectric capping material overlying the oxide isolation region, the dielectric capping material being more resistant to an etchant than the oxide isolation region.

18. The semiconductor device of claim 17, wherein the dielectric capping material comprises a hydrofluoric acid resistant material.

19. The semiconductor device of claim 17, wherein:

the oxide isolation region is recessed by a first distance relative to the active region; and

the dielectric capping material comprises a nitride material having a thickness greater than or equal to the first distance.

20. The semiconductor device of claim 19, further comprising an oxide material disposed between the oxide isolation region and the nitride material, wherein the nitride material extends above an upper surface of the active region by a distance that is influenced by a thickness of the oxide material.

CLAIMS

1. A method of fabricating a semiconductor device on a semiconductor substrate comprising a semiconductor material, the method comprising:

forming an isolation region in the semiconductor substrate, the isolation region being recessed relative to a first region of the semiconductor material adjacent to the isolation region, the isolation region comprising a first dielectric material;

forming a first layer of a second dielectric material overlying the isolation region and the first region, the second dielectric material being more resistant to an etchant than the first dielectric material;

removing the second dielectric material overlying the first region leaving portions of the second dielectric material overlying the isolation region intact; and

forming a second layer of a third dielectric material overlying the isolation region and the first region prior to forming the first layer, the first layer overlying the second layer, and wherein removing the second dielectric material comprises planarizing the first layer to obtain a planar surface aligned with portions of the second layer overlying the first region laterally adjacent to the isolation region.

2. The method of claim 1, wherein forming the isolation region comprises forming an oxide material in a trench adjacent to the first region, the second dielectric material being more resistant to hydrofluoric acid-comprising etchants than the oxide material.

3. The method of claim 1, wherein:

forming the second layer comprises conformably depositing the third dielectric material overlying the isolation region and the first region; and

forming the first layer comprises conformably depositing the second dielectric material overlying the third dielectric material.

4. The method of claim 3, the isolation region being recessed relative to the first region by a first distance, wherein conformably depositing the second dielectric material comprises depositing the second dielectric material to a first thickness greater than the first distance.

5. The method of claim 4, wherein conformably depositing the third dielectric material comprises depositing the third dielectric material to a second thickness less than the first distance.

6. The method of claim 1, the isolation region being recessed relative to the first region by a first distance, wherein;

forming the second layer comprises forming the second layer having a first thickness less than the first distance; and

forming the first layer comprises forming the first layer having a second thickness greater than the first distance.

7. The method of claim 6, wherein:

forming the second layer comprises conformably depositing an oxide material overlying the isolation region and the first region; and

forming the first layer comprises conformably depositing a nitride material overlying the oxide material.

8. The method of claim 7, wherein removing the second dielectric material comprises polishing the nitride material until the oxide material overlying the first region is exposed.

9. The method of claim 7, wherein removing the second dielectric material comprises removing portions of the nitride material to obtain a planar surface aligned with the oxide material overlying the first region.

10. The method of claim 1, further comprising:

removing the third dielectric material overlying the first region; and

forming a transistor structure on the first region.

11. A method of fabricating a semiconductor device on a semiconductor substrate comprising a semiconductor material, the method comprising:

forming an oxide isolation region adjacent to a first region of the semiconductor material, the oxide isolation region being recessed relative to the first region;

conformably depositing a nitride material overlying the first region and the oxide isolation region;

removing the nitride material overlying the first region leaving a portion of the nitride material overlying the oxide isolation region intact; and

conformably depositing an oxide material overlying the first region and the oxide isolation region prior to conformably depositing the nitride material, and wherein removing the nitride material comprises planarizing the nitride material to obtain a planar surface aligned with the oxide material overlying the first region laterally adjacent to the oxide isolation region.

12. The method of claim 11, further comprising conformably depositing an oxide material overlying the first region and the oxide isolation region prior to conformably depositing the nitride material, wherein removing the nitride material comprises polishing the nitride material until the oxide material is exposed.

13. The method of claim 11, the oxide isolation region being recessed relative to the first region by a first distance, wherein:

conformably depositing the oxide material comprises depositing the oxide material to a first thickness less than the first distance; and

conformably depositing the nitride material comprises depositing the nitride material to a second thickness greater than the first distance.

14. A semiconductor device fabricated in accordance with any of the preceding claims.