CLAIMS

1. A three-dimensional memory array, comprising:

a first layer comprising a first phase change memory element coupled to a first electrode;

a second layer comprising a second phase change memory element coupled to a second electrode;

a third layer comprising a stack of at least three sublayers, wherein the at least three sublayers each separate the first phase change memory element from the second phase change memory element and are each parallel to one another and to the first layer and the second layer, wherein the at least three sublayers comprise a third sublayer positioned between a first sublayer and a second sublayer; and

a third electrode coupled to the first and second phase change memory elements, wherein the third electrode is substantially perpendicular to the first, second, and third layers, wherein the third sublayer abuts the third electrode.

2. The three-dimensional memory array of claim 1, wherein the stack of at least three sublayers comprises electrical and thermal insulators.

3. The three-dimensional memory array of claim 1, wherein the stack of at least three sublayers comprises an oxide material.

4. The three-dimensional memory array of claim 1, wherein the stack of at least three sublayers comprises materials with a different composition or stoichiometry from each other.

5. The three-dimensional memory array of claim 1, wherein the third sublayer is a thermal conductor.

6. The three-dimensional memory array of claim 1, wherein the third sublayer comprises at least one of a metal, carbon, or a compound comprising silicon and nitrogen.

7. The three-dimensional memory array of claim 1, wherein the first electrode, the second electrode, and the third electrode each comprise at least one of tungsten, tungsten nitride, aluminum, titanium, titanium nitride, silicon, doped polycrystalline silicon, or carbon, or any combination thereof.

8. The three-dimensional memory array of claim 1, further comprising:

a selection component coupled to the third electrode and to at least one of the first phase change memory element and the second phase change memory element; and

a conductive line coupled to the selection component, wherein the selection component separates the conductive line from the third electrode.

9. The three-dimensional memory array of claim 8, wherein the selection component comprises a diode, a bipolar junction device, an ovonic threshold selector, a field effect transistor, or a chalcogenide material.

10. The three-dimensional memory array of claim 1, wherein the first phase change memory element and the second phase change memory element each comprise a chalcogenide material.

11. The three-dimensional memory array of claim 1, wherein the first phase change memory element and the second phase change memory element each comprise a material with a programmable resistivity.

12. The three-dimensional memory array of claim 1, wherein the first and second phase change memory elements are coaxial with the third electrode.

13. A three-dimensional memory array, comprising:

a first layer that comprises a first phase change memory cell and a first electrode, wherein the first phase change memory cell comprises a chalcogenide material and is coupled to the first electrode;

a second layer that comprises a second phase change memory cell and a second electrode, wherein the second phase change memory cell comprises the chalcogenide material and is coupled to the second electrode, and wherein the second layer is substantially parallel to the first layer;

a plurality of insulating layers that each separate the first phase change memory cell from the second phase change memory cell, wherein the plurality of insulating layers are each parallel to one another and to the first and second layers, and wherein a first insulating layer and a second insulating layer of the plurality each comprise an electrical insulator;

a third electrode positioned substantially perpendicular to the first and second layers, wherein the third electrode is adjacent to the first and second phase change memory cells; and

a selection component coupled to the third electrode and the first phase change memory cell and the second phase change memory cell, wherein the selection component is positioned between the third electrode and the first memory cell.

14. The three-dimensional memory array of claim 13, wherein the plurality of insulating layers comprises three or more insulating layers.

15. The three-dimensional memory array of claim 13, wherein the selection component is coaxial with the third electrode.