WHAT IS CLAIMED IS:

1. An electronic device comprising:

a first electrode;

a phase change material element disposed on the first electrode;

a second electrode disposed on the phase change material element, the second electrode comprising a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity.

2. The electronic device of Claim 1, wherein the phase change material element comprises a chalcogenide material and the second thermal resistivity is lower than the first thermal resistivity by a ratio of at least 10.

3. The electronic device of Claim 2, wherein the metallic contact region comprises tungsten.

4. The electronic device of Claim 2, wherein the metallic contact region is in contact with the thermally insulating region.

5. The electronic device of Claim 2, wherein the phase change material element is a storage node of a memory cell.

6. The electronic device of Claim 5, further comprising a selector device electrically coupled to the storage node through the first electrode.

7. The electronic device of Claim 6 wherein the selector device is a bipolar junction transistor.

8. The electronic device of Claim 6 wherein the selector device is an ovonic threshold switch.

9. The electronic device of Claim 2, wherein the phase change material element is a selector node of a memory cell.

10. The electronic device of Claim 9, further comprising a storage node electrically coupled to the selector node through the first electrode.

11. The electronic device of Claim 2, wherein the phase change material element has a first surface and a second surface, and the metallic contact region is in contact with the first surface.

12. The electronic device of Claim 11, wherein the metallic contact region in contact with the first surface forms a first interface having an interfacial resistance below about 10^{-6} $\Omega \cdot cm^2$.

13. The electronic device of Claim 11, wherein the phase change material element has first and second sidewalls extending between first and second surfaces, the electronic device further including sidewall thermal insulators formed over first and second sidewalls.

14. The electronic device of Claim 13, wherein sidewall thermal insulators include plurality of sidewall layers, the sidewall layers including first sidewall layers on the first and second sidewalls and second sidewall layers on first sidewall layers.

15. The electronic device of Claim 1, wherein the first electrode comprises a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and wherein the first electrode further comprises a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity.

16. The electronic device of Claim 1, wherein the first electrode forms a wall structure having a wall width along a first horizontal direction and a wall thickness along a second horizontal direction substantially perpendicular to the first horizontal direction, wherein the wall thickness is substantially smaller than the wall width.

17. A method of fabricating an electronic device comprising:

forming a first electrode;

forming a phase change material element on the first electrode; and

forming a second electrode on the phase change material element, the second electrode comprising a metallic contact region on the phase change material element and a thermally insulating region comprising carbon on the metallic contact region, wherein the thermally insulating region has a first thermal resistivity and the metallic contact region has a second thermal resistivity lower than the first thermal resistivity.

18. The method of Claim 17, wherein forming a second electrode includes forming the metallic contact region having a second thermal resistivity lower than the first thermal resistivity by a ratio of at least 10.

19. The method of Claim 18, wherein coupling includes coupling the phase change material element to an ovonic threshold switch.

20. The method of Claim 19, wherein forming the phase change material element includes forming a first surface and a second surface, and forming the second electrode includes contacting the metallic contact region to the first surface.

21. The method of Claim 20, further including forming sidewall thermal insulators over first and second sidewalls of the phase change materials, the first and second sidewalls extending between first and second surfaces.

22. The method of Claim 21, wherein forming sidewall thermal insulators includes forming a plurality of sidewall layers, the sidewall layers including first sidewall layers on first and second sidewalls and second sidewall layers on first sidewall layers.

23. The method of Claim 17, wherein forming the first electrode comprises forming a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and wherein forming the first electrode further comprises forming a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity.

24. The method of Claim 17, wherein forming the first electrode comprises forming a wall structure having a wall width along a first horizontal direction and a wall thickness along a second horizontal direction substantially perpendicular to the first horizontal direction, wherein the wall thickness is substantially smaller than the wall width.

WHAT IS CLAIMED IS:

1. An electronic device comprising:

a first electrode;

a phase change material element disposed on the first electrode;

a second electrode disposed on the phase change material element, the second electrode comprising a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity,

wherein the first electrode, the second electrode, and the phase change material element have dimensions and electrical resistivities such that an electrical resistance of a bulk material of the phase change material element is greater than a combined electrical resistance of a bulk material of the thermally insulating region, a bulk material of the metallic contact region, and an interface between the metallic contact region and the phase change material element.

2. The electronic device of Claim 1, wherein the phase change material element comprises a chalcogenide material and the second thermal resistivity is lower than the first thermal resistivity by a ratio of at least 10.

3. The electronic device of Claim 2, wherein the metallic contact region comprises tungsten.

4. The electronic device of Claim 2, wherein the metallic contact region is in contact with the thermally insulating region.

5. The electronic device of Claim 2, wherein the phase change material element is a storage node of a memory cell.

6. The electronic device of Claim 5, further comprising a selector device electrically coupled to the storage node through the first electrode.

7. The electronic device of Claim 6, wherein the selector device is a bipolar junction transistor.

8. The electronic device of Claim 6, wherein the selector device is an ovonic threshold switch.

9. An electronic device comprising:

a first electrode;

a phase change material disposed on the first electrode, wherein the phase change material element is a selector node of a memory cell; and

a second electrode disposed on the phase change material element, the second electrode comprising a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity.

10. The electronic device of Claim 9, further comprising a storage node electrically coupled to the selector node through the first electrode.

11. The electronic device of Claim 2, wherein the phase change material element has a first surface and a second surface, and the metallic contact region is in contact with the first surface.

12. The electronic device of Claim 11, wherein the metallic contact region in contact with the first surface forms a first interface having an interfacial resistance below about 10^{-6} $\Omega \cdot cm^2$.

13. The electronic device of Claim 11, wherein the phase change material element has first and second sidewalls extending between first and second surfaces, the electronic device further including sidewall thermal insulators formed over first and second sidewalls.

14. The electronic device of Claim 13, wherein sidewall thermal insulators include plurality of sidewall layers, the sidewall layers including first sidewall layers on the first and second sidewalls and second sidewall layers on first sidewall layers.

15. The electronic device of Claim 1, wherein the first electrode comprises a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and wherein the first electrode further comprises a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity.

16. The electronic device of Claim 1, wherein the first electrode forms a wall structure having a wall width along a first horizontal direction and a wall thickness along a second horizontal direction substantially perpendicular to the first horizontal direction, wherein the wall thickness is substantially smaller than the wall width.

17. The electronic device of Claim 1, wherein the first thickness is selected to be between about 10nm and about 50nm, the second thickness is selected to be between about 5nm and about 30nm and the third thickness is between about 10nm and about 50nm.

18. An electronic device comprising:

a first electrode;

a phase change material element disposed on the first electrode;

a second electrode disposed on the phase change material element, the second electrode comprising a thermally insulating region, the thermally insulating region comprising carbon and having a first thermal resistivity, and a metallic contact region interposed between the phase change material element and the thermally insulating region, the metallic contact region having a second thermal resistivity lower than the first thermal resistivity; and

an access line disposed on the second electrode and extending in a first direction, wherein the access line and at least the second electrode have a same nominal width measured in a second direction crossing the first direction.

19. The electronic device of Claim 18, wherein the phase change material element and the first electrode have the same nominal width.

20. The electronic device of Claim 18, further comprising:

a second access line disposed under the second electrode and extending in the second direction.

21. The electronic device of Claim 18, wherein the access line and the second access line are metallic lines.