Claims

1. A chalcogenide material having a composition of matter comprising:

selenium in an amount greater than or equal to 40% by weight, relative to a total weight of the composition;

arsenic in an amount ranging from 10% to 35% by weight, relative to the total weight of the composition;

thallium in an amount ranging from 0.15% to 35% by weight, relative to the total weight of the composition; and

silicon, wherein the composition comprises a combination of germanium, the silicon, and the thallium in an amount greater than or equal to 20% by weight, relative to the total weight of the composition, and

wherein the germanium is in an amount ranging from 1% to 20% by weight, relative to the total weight of the composition.

2. The chalcogenide material of claim 1, wherein the silicon is in an amount ranging from 1% to 15% by weight, relative to the total weight of the composition.

3. The chalcogenide material of claim 1, wherein the selenium is in an amount greater than or equal to 45% by weight, relative to the total weight of the composition.

4. The chalcogenide material of claim 1, wherein the arsenic is in an amount ranging from 12% to 32% by weight, relative to the total weight of the composition.

~~1. A chalcogenide material having a composition of matter, comprising:~~

~~silicon;~~

~~germanium; and~~

~~at least one element selected from a group of consisting of boron, aluminum, gallium, indium, and thallium, wherein a combination of the silicon, the germanium, and the at least one element selected from the group consisting of boron, aluminum, gallium, indium, and thallium is in an amount greater than or equal to 20% by weight, relative to a total weight of the composition.~~

~~2. The composition of claim 1, further comprising selenium.~~

~~3. The composition of claim 2, wherein the selenium is in an amount greater than or equal to 40% by weight, relative to the total weight of the composition.~~

~~4. The composition of claim 1, further comprising arsenic.~~

~~5. The composition of claim 4, wherein the arsenic is in an amount ranging from 10% to 35% by weight, relative to the total weight of the composition.~~

~~6. The composition of claim 1, wherein the at least one element selected from the group consisting of boron, aluminum, gallium, indium, and thallium is in an amount ranging from 1% to 12% by weight, relative to the total weight of the composition.~~

~~7. The composition of claim 1, wherein the germanium is in an amount ranging from 8% to 20% by weight, relative to the total weight of the composition.~~

~~8. The composition of claim 1, wherein the silicon is in an amount ranging from 1% to 10% by weight, relative to the total weight of the composition.~~

~~9. A chalcogenide material having a composition of matter, comprising:~~

~~selenium;~~

~~silicon; and~~

~~at least one element selected from a group consisting of boron, aluminum, gallium, indium, and thallium in an amount ranging from 0.15% to 35% by weight, relative to a total weight of the composition.~~

~~10. The composition of claim 9, wherein the selenium is in an amount greater than or equal to 40% by weight, relative to the total weight of the composition.~~

~~11. The composition of claim 9, wherein the selenium is in an amount greater than or equal to 45% by weight, relative to the total weight of the composition.~~

~~12. The composition of claim 9, wherein the silicon is in an amount ranging from 1% to 15% by weight, relative to the total weight of the composition.~~

~~13. The composition of claim 9, further comprising:~~

~~arsenic, wherein the arsenic is in an amount ranging from 10% to 35% by weight, relative to the total weight of the composition.~~

~~14. The composition of claim 9, further comprising:~~

~~germanium, wherein a combination of the silicon, the germanium, and the at least one element selected from the group consisting of boron, aluminum, gallium, indium, and thallium is in an amount greater than or equal to 20% by weight, relative to the total weight of the composition.~~

~~15. A chalcogenide material having a composition of matter, comprising:~~

~~selenium;~~

~~arsenic; and~~

~~at least one element selected from a group consisting of boron, aluminum, gallium, and indium in an amount ranging from 0.15% to 35% by weight, relative to a total weight of the composition.~~

~~16. The composition of claim 15, further comprising silicon.~~

~~17. The composition of claim 15, wherein the selenium is in an amount greater than or equal to 40% by weight, relative to the total weight of the composition.~~

~~18. The composition of claim 15, further comprising:~~

~~germanium, wherein the germanium is in an amount ranging from 1% to 20% by weight, relative to the total weight of the composition.~~

~~19. The composition of claim 15, wherein the arsenic is in an amount ranging from 10% to 35% by weight, relative to the total weight of the composition.~~

~~20. The composition of claim 15, wherein the at least one element selected from the group consisting of boron, aluminum, gallium, and indium is in an amount ranging from 0.15% to 24% by weight, relative to the total weight of the composition.~~

~~21~~5. An apparatus, comprising:

a memory element, wherein the memory element has a composition comprising:

selenium in an amount greater than or equal to 40% by weight, relative to a total weight of the composition;

arsenic in an amount ranging from 10% to 35% by weight, relative to the total weight of the composition; ~~and~~

thallium in an amount ranging from 0.15% to 35% by weight, relative to the total weight of the composition; and

silicon, wherein the composition of the memory element comprises a combination of germanium, the silicon, and the thallium in an amount greater than or equal to 20% by weight, relative to the total weight of the composition, and

wherein the germanium is in an amount ranging from 1% to 20% by weight, relative to the total weight of the composition.

~~22~~6. The apparatus of claim ~~21~~5, wherein the composition of the memory element comprises:

the silicon in an amount ranging from 1% to 15% by weight, relative to the total weight of the composition.

~~23~~7. The apparatus of claim ~~21~~5, wherein the composition of the memory element comprises:

the selenium in an amount greater than or equal to 45% by weight, relative to the total weight of the composition.

~~24~~8. The apparatus of claim ~~21~~5, wherein the composition of the memory element comprises:

the arsenic in an amount ranging from 12% to 32% by weight, relative to the total weight of the composition.

~~25~~9. The apparatus of claim ~~21~~5, wherein the memory element comprises a self-selecting memory device.