

WHAT IS CLAIMED IS:

1. A strain tolerant particle comprising:
a plurality of walls surrounding a plurality of voids, the walls being between 10-90% of a total volume of the particle; and
Si, Si monoxide, Sn, or Sn oxide;
wherein the particle is configured to stay within 50 volume % during lithiation and delithiation.
2. The particle of Claim 1, wherein the plurality of voids are closed cells.
3. The particle of Claim 1, wherein the plurality of voids are open cells.
4. The particle of Claim 1, wherein the plurality of voids are a mixture of closed cells and open cells.
5. The particle of any one of Claims 1-4, wherein the plurality of walls are between 20 and 50% of the total volume of the particle.
6. The particle of any one of Claims 1-5, wherein the plurality of walls have a thickness of between 50 and 150 nm.
7. The particle of any one of Claims 1-6, wherein the particle is coated with carbon.
8. The particle of any one of Claims 1-7, wherein the particle is configured to stay within 10 volume % during lithiation and delithiation.
9. The particle of any one of Claims 1-8, wherein the particle further comprises a transition metal.
10. The particle of Claim 1-9, wherein the particle comprises polydimethylsiloxane.
11. The particle of Claim 1-9, wherein the particle comprises diphenylsiloxane.
12. A powder formed from a plurality of the particle of any one of Claims 1-11.
13. The powder of Claim 12, wherein a D50 of the powder lies between 0.2 and 100 um.
14. An anode formed from the particle of any one of Claims 1-11.
15. A battery formed from the anode of Claim 14.
16. A method of manufacturing a strain tolerant powder, the method comprising:
preparing a precursor material including an Si, Si monoxide, Sn, or Sn oxide material and a component that produces gas;
forming droplets from the precursor material; and

interacting the droplets in a plasma or plasma exhaust of a microwave plasma torch to produce gases from the component and form a powder of a plurality of particles;

wherein the precursor material is configured to prevent gas bubbles formed during synthesis from coalescing and/or escaping; and

wherein the particles in the powder are configured to stay within 50 volume % during lithiation and delithiation.

17. The method of Claim 16, wherein a viscosity of the precursor material is between 3 and 500 cS.

18. The method of Claim 16 or 17, wherein the plurality of particles includes a carbon coating.

19. The method of any one of Claims 16-18, wherein the plurality of particles includes an Al₂O₃ coating.

20. A strain tolerant particle comprising:

a composition comprising:

silicon, tin, or a combination of silicon and tin;

a transition metal; and

silica; and

a plurality of walls surrounding a plurality of voids, the walls being between 10-90% of a total volume of the particle;

wherein the particle is configured to stay within 50 volume % during lithiation and delithiation.