WHAT IS CLAIMED IS:

1. A method for forming a powder metallurgy article that is a consolidated product, the method comprising:

consolidating a spherical metal powder into a consolidated body by a powder metallurgy technique to form a metallurgical article; wherein the metal is tantalum or tantalum metal alloy~~powder that includes a spherical metal powder into a consolidated body by a powder metallurgy technique to form a metallurgical article~~; and

said spherical metal powder ~~optionally heating treating said consolidated body; wherein said spherical metal powder~~ comprises

a. a spherical shape wherein the powder has an average aspect ratio of from 1.0 to 1.4;

b. a purity of metal of at least 99 wt% metal based on total weight of said metal powder, excluding gas impurities;

c. an average particle size of from ~~about~~ 0.5 micron to ~~about~~ 250 microns;

d. an apparent density from ~~about~~ 4 g/cc to ~~about~~ 19.3 g/cc;

e. a true density that is within +- 3% of the metal; and

f. a Hall flow rate of 40 sec or less, the Hall flow rate is a measure of the time the spherical metal powder flows through the orifice of a Hall Flowmeter funnel, according to the ASTM B213 standard.

2. A method for forming a powder metallurgy article that is a consolidated product, the method comprising:

consolidating a spherical metal powder and a non-spherical metal powder into a consolidated body by a powder metallurgy technique to form a metallurgical article; wherein the metal is tantalum or tantalum metal alloy; and

said spherical metal powder comprises

a. a spherical shape wherein the powder has an average aspect ratio of from 1.0 to 1.4;

b. a purity of metal of at least 99 wt% metal based on total weight of said metal powder, excluding gas impurities;

c. an average particle size of from 0.5 micron to 250 microns;

d. an apparent density from 4 g/cc to 19.3 g/cc;

e. a true density that is within +- 3% of the metal; and

f. a Hall flow rate of 40 sec or less, the Hall flow rate is a measure of the time the spherical metal powder flows through the orifice of a Hall Flowmeter funnel, according to the ASTM B213 standard;

said non-spherical metal powder is a non-spherical shape having an average aspect ratio other than 1.0 to 1.4~~The method of claim 1, wherein said heat treating is utilized~~.

3. The method of claim 1 or 2, further comprising heating ~~wherein said heat~~ treating said consolidated body~~is one or more sintering steps or one or more annealing steps~~.

4. The method of claim ~~1~~3, wherein said- heat treating is utilized~~consolidated product is a sputtering target~~.

5. The method of claim ~~1~~4, wherein said heat treating is one or more sintering steps or one or more annealing steps~~further comprising machining said consolidated product~~.

6. The method of claim 1 or 2, further comprising subjecting said consolidated product to one or more mechanical or thermo-mechanical processing steps.

7. The method of claim 1 or 2, wherein said method is conducted in the absence of any mechanical or thermo-mechanical processing step.

8. The method of claim 1 or 2, wherein the spherical or non-spherical~~said~~ metal powder has an oxygen level of less than 350 ppm.

~~9. The method of claim 1, wherein said metal powder has an oxygen level of less than 200 ppm.~~

~~10~~9. The method of claim 1 or 2, wherein ~~said~~ the average aspect ratio of said spherical metal powder is from 1.0 to 1.25.

~~11. The method of claim 1, wherein said average aspect ratio is from 1.0 to 1.1.~~

~~12. The method of claim 1, wherein said purity is at least 99.995 wt% metal.~~

~~13. The method of claim 1, wherein said average particle size is from about 0.5 micron to about 10 microns.~~

~~14. The method of claim 1, wherein said average particle size is from about 5 microns to about 25 microns.~~

~~15. The method of claim 1, wherein said average particle size is from about 15 microns to about 45 microns.~~

~~16. The method of claim 1, wherein said average particle size is from about 35 microns to about 75 microns.~~

~~17. The method of claim 1, wherein said average particle size is from about 55 microns to about 150 microns.~~

~~18. The method of claim 1, wherein said average particle size is from about 105 microns to about 250 microns.~~

~~19~~10. The method of claim 1 or 2, wherein the~~said~~ spherical or non-spherical metal powder has at least one of the following properties:

a. a D10 size of from ~~about~~ 5 microns to 25 microns; or

b. a D90 size of from ~~about~~ 20 microns to 80 microns.

~~20. The method of claim 1, wherein said metal powder is selected from tantalum, niobium, aluminum, copper, titanium, magnesium, tungsten, gold, silver, cobalt, zirconium, silicon, rhenium, molybdenum, or alloys thereof, or any combinations thereof.~~

~~21. The method of claim 1, wherein said metal powder comprises or is selected from a BBC metal.~~

~~22. The method of claim 1, wherein said metal powder further comprises non-spherical metal powder.~~

~~23. The method of claim 22, wherein said non-spherical metal powder comprises angular metal powder, flake metal powder, or nodular metal powder.~~

~~24~~11. The method of claim 2~~2~~, wherein said spherical metal powder ~~comprises~~ is from 1% to 99% by weight and ~~of~~ said non-spherical metal powder ~~and~~ is from 1% to 99% by weight ~~of said non-spherical metal powder~~.

~~25. The method of claim 22, wherein said metal powder comprises from 25% to 75% by weight of said spherical metal powder and from 25% to 75% by weight of said non-spherical metal powder.~~

~~26. The method of claim 22, wherein said metal powder comprises from 50% to 99% by weight of said spherical metal powder and from 1% to 50% by weight of said non-spherical metal powder.~~

~~27. The method of claim 22, wherein said metal powder comprises from 75% to 99% by weight of said spherical metal powder and from 1% to 25% by weight of said non-spherical metal powder.~~

~~28~~12. The method of claim 1 or 2, wherein said spherical metal powder comprises at least two different size fractions based on average particle size.

~~29. The method of claim 1, wherein said spherical metal powder comprises a first size fraction having an average particle size from about 10 microns to about 25 microns, and a second size fraction of from about 26 microns to about 45 microns.~~

~~30. The method of claim 1, wherein said consolidated product is in the shape of a billet, and said method further comprises dividing said billet into multiple discs, each having a shape of a sputtering target.~~

~~31~~13. The method of claim 1 or 2, said method further comprises:

a. plasma heat-treating a starting metal powder to at least partially melt at least an outer surface of said starting metal powder in an inert atmosphere to obtain a heat-treated metal powder, and

b. cooling said heat-treated metal powder in an inert atmosphere to obtain said spherical or non-spherical metal powder.

~~32. The method of claim 31, wherein said starting metal powder is tantalum powder.~~

~~33~~14. The method of claim 1 or 2, wherein said spherical or non-spherical metal powder has an oxygen content of 500 ppm or less and has a nitrogen content of at least ~~about~~ 40 ppm.

15. The method of claim 1 or 2, wherein said consolidating comprises compressing said metal powder to from 80 to 100% of theoretical density with compressive forces of from 30,000 to 90,000 psi.

~~34. The method of claim 1, wherein said consolidating is at a temperature not exceeding 0.7 T_H of said metal powder.~~

~~35. The method of claim 1, wherein said consolidating comprises compressing said metal powder to from about 80 to about 100% of theoretical density with compressive forces of from about 30,000 to about 90,000 psi.~~

~~36. The method of claim 1, wherein said powder metallurgy technique comprises hot isostatic pressing or cold isostatic pressing or vacuum hot pressing.~~

~~37. The method of claim 1, wherein said powder metallurgy technique comprises extrusion.~~

~~38~~16. A powder metallurgy article comprising a metal powder that is consolidated into a consolidated body that has a density of at least 75% of the theoretical density, wherein said metal powder is a spherical metal powder, or a non-spherical metal powder having a spherical shape and a non-spherical shape having an average aspect ratio other than 1.0 to 1.4, the metal is tantalum or a tantalum metal alloy, ~~comprises a spherical metal powder,~~and said spherical metal powder comprising

a. a spherical shape wherein the powder has an average aspect ratio of from 1.0 to 1.4;
b. a purity of metal of at least 99 wt% metal based on total weight of said metal powder, excluding gas impurities;
c. an average particle size of from ~~about~~ 0.5 micron to ~~about~~ 250 microns;
d. an apparent density from ~~about~~ 4 g/cc to ~~about~~ 19.3 g/cc;

e. a true density that is within +- 3% of the metal; and

f. a Hall flow rate of 40 sec or less, the Hall flow rate is a measure of the time the spherical metal powder flows through the orifice of a Hall Flowmeter funnel, according to the ASTM B213 standard.

~~39. The powder metallurgy article of claim 38, wherein said spherical metal powder is plasma heat-treated.~~

~~40. The powder metallurgy article of claim 38, wherein said powder metallurgy article has an oxygen level of less than 350 ppm.~~

~~41. The powder metallurgy article of claim 38, wherein said powder metallurgy article has an oxygen level of less than 200 ppm.~~

~~42. The powder metallurgy article of claim 38, wherein said average aspect ratio is from 1.0 to 1.25.~~

~~43. The powder metallurgy article of claim 38, wherein said average aspect ratio is from 1.0 to 1.1.~~

~~44. The powder metallurgy article of claim 38, wherein said powder metallurgy article has a purity of at least 99.995 wt% metal.~~

~~45. The powder metallurgy article of claim 38, wherein said average particle size is from about 0.5 micron to about 10 microns.~~

~~46. The powder metallurgy article of claim 38, wherein said average particle size is from about 5 microns to about 25 microns.~~

~~47. The powder metallurgy article of claim 38, wherein said average particle size is from about 15 microns to about 45 microns.~~

~~48. The powder metallurgy article of claim 38, wherein said average particle size is from about 35 microns to about 75 microns.~~

~~49. The powder metallurgy article of claim 38, wherein said average particle size is from about 55 microns to about 150 microns.~~

~~50. The powder metallurgy article of claim 38, wherein said average particle size is from about 105 microns to about 250 microns.~~

~~51. The powder metallurgy article of claim 38, wherein said metal powder has at least one of the following properties:~~

~~a. a D10 size of from about 5 microns to 25 microns; or~~

~~b. a D90 size of from about 20 microns to 80 microns.~~

~~52. The powder metallurgy article of claim 38, wherein said powder metallurgy article comprises niobium, tantalum, or a combination thereof.~~

~~53. The powder metallurgy article of claim 38, wherein said powder metallurgy article comprises a BBC metal.~~

~~54. The powder metallurgy article of claim 38, wherein said metal powder further comprises non-spherical metal powder.~~

~~55. The powder metallurgy article of claim 54, wherein said non-spherical metal powder comprises angular metal powder, flake metal powder, nodular metal powder.~~

~~56. The powder metallurgy article of claim 54, wherein said metal powder comprises from 1% to 99% by weight of said spherical metal powder and from 1% to 99% by weight of said non-spherical metal powder.~~

~~57. The powder metallurgy article of claim 54, wherein said metal powder comprises from 25% to 75% by weight of said spherical metal powder and from 25% to 75% by weight of said non-spherical metal powder.~~

~~58. The powder metallurgy article of claim 54, wherein said metal powder comprises from 50% to 99% by weight of said spherical metal powder and from 1% to 50% by weight of said non-spherical metal powder.~~

~~59. The powder metallurgy article of claim 54, wherein said metal powder comprises from 75% to 99% by weight of said spherical metal powder and from 1% to 25% by weight of said non-spherical metal powder.~~

~~60. The powder metallurgy article of claim 38, wherein said spherical metal powder comprises at least two different size fractions based on average particle size.~~

~~61. The powder metallurgy article of claim 38, wherein said spherical metal powder comprises a first size fraction having an average particle size from about 10 microns to about 25 microns, and a second size fraction of from about 26 microns to about 45 microns.~~

~~62~~17. A sputtering target assembly comprising the powder metallurgy article of claim ~~38~~ 16 as a sputter target and a backing plate.

~~63. The sputtering target assembly of claim 62, wherein said sputter target has a yield strength of from about 18,000 to about 40,000 psi and an elongation to failure of about 20% or more.~~

~~64. The sputtering target assembly of claim 62, wherein said sputter target has a purity of from about 99.5% or greater.~~

~~65. The sputtering target assembly of claim 62, wherein said sputter target has an average grain size of about 300 microns or less.~~

~~66. The sputtering target assembly of claim 62, wherein said sputter target has an average grain size of 100 microns or less.~~

~~67. The sputtering target assembly of claim 62, wherein said sputter target has an average grain size of about 50 microns or less.~~

~~68. The sputtering target assembly of claim 62, wherein said sputter target has an average grain size of about 10 microns or less.~~

~~69. The sputtering target assembly of claim 62, wherein said sputter target has a random texture on the surface or throughout the entire thickness of said metal.~~

~~70. The sputtering target assembly of claim 62, wherein said sputter target has a uniform primary texture on the surface or throughout the entire thickness of said metal.~~

~~71. The sputtering target assembly of claim 62, wherein said sputter target has a uniform primary texture of (111) on the surface or throughout the entire thickness of said metal.~~

~~72. The sputtering target assembly of claim 62, wherein said sputter target has a random texture on the surface or throughout the entire thickness of said metal.~~

~~73. The sputtering target assembly of claim 62, wherein said sputter target has a uniform primary texture of (110) on the surface or throughout the entire thickness of said metal.~~