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; 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.

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.

3. The method of claim 1 or 2, further comprising heating treating said consolidated body.

4. The method of claim 3, wherein said heat treating is utilized.

5. The method of claim 4, wherein said heat treating is one or more sintering steps or one or more annealing steps.

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 metal powder has an oxygen level of less than 350 ppm.

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

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

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

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

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

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.

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.

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 40 ppm.

15. The method of claim 1 or 2, wherein said consolidating comprises compressing said metal powder to from 80 to100% of theoretical density with compressive forces of from 30,000 to 90,000 psi.

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, 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 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.

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