CLAIMS

1. A powder of melted particles, more than 95% by number of said particles exhibiting a circularity of greater than or equal to 0.85, said powder comprising more than 99.8% of a rare earth metal oxide and/or of hafnium oxide and/or of an aluminum oxide, as percentage by mass based on the oxides, and having:
   - a median particle size D_{50} of less than 15 µm, a 90 percentile of the particle sizes, D_{90}, of less than 30 µm, and a size dispersion index $(D_{90} – D_{10})/D_{10}$ of less than 2;
   - a relative density of greater than 90%,

   the D_n percentiles of the powder being the particle sizes corresponding to the percentages, by number, of n%, on the cumulative distribution curve of the size of the particles in the powder, the particle sizes being classified by increasing order.

2. The powder as claimed in the immediately preceding claim, exhibiting
   - a percentage by number of particles having a size of less than or equal to 5 µm which is greater than 5%, and/or
   - a median particle size D_{50} of less than 10 µm, and/or
   - a 90 percentile of the particle sizes, D_{90}, of less than 25 µm, and/or
   - a 99.5 percentile of the particle sizes, $D_{99.5}$, of less than 40 µm, and/or
   - a size dispersion index $(D_{90}-D_{10})/D_{10}$ of less than 1.5.

3. The powder as claimed in either of the preceding claims, in which the median size of the particles, D_{50}, is less than 8 µm.

4. The powder as claimed in any one of the preceding claims, comprising, as percentage by mass based on the oxides, more than 99.8% of Yb_2O_3 and/or Y_2O_3 and/or $Y_3Al_5O_{12}$ and/or of an yttrium oxyfluoride, preferably of the formula $Y_aO_bF_c$ in which a is 1, b is between 0.7 and 1.1, and c is between 1 and 1.5, preferably an oxyfluoride selected from YOF and $Y_5O_4F_7$ or a mixture of these oxyfluorides.

5. A process for manufacturing a powder as claimed in any one of the preceding claims, said process comprising the following steps:
   a) granulating a particulate charge so as to obtain a granule powder having a median size D'_{50} of between 20 and 60 microns, the particulate charge comprising more than 99.8% of a rare earth metal oxide and/or of hafnium oxide and/or of an aluminum oxide, as percentage by mass based on the oxides;

b) injecting said granule powder, via a carrier gas, through at least one injection orifice to a plasma jet generated by a plasma gun, under injection conditions which are sufficiently violent to simultaneously reduce the median size of the feed powder obtained in step c) and decrease the proportion of hollow particles, by giving rise to the bursting of more than 50% of the granules injected, as percentage by number, so as to obtain molten droplets, the flow rate of the granule powder injected being less than 2 g/min per KW of plasma gun power, and the ratio of the quantity by mass of granules injected via said injection orifice, preferably by each injection orifice, to the surface area of said injection orifice being greater than 16 g/min per mm^2 of surface area of said injection orifice;

c) cooling said molten droplets, so as to obtain a feed powder as claimed in any one of the preceding claims;

d) optionally, performing particle size selection on said feed powder.

6. The process as claimed in the immediately preceding claim, in which the injection conditions are determined such as to bring about the bursting of more than 70% of the granules injected, as percentage by number.

7. The process as claimed in the immediately preceding claim, in which the injection conditions are determined such as to bring about the bursting of more than 90% of the granules injected, as percentage by number.

8. The process for manufacturing a powder as claimed in any one of claims 5 to 7, in which, in step b), the injection conditions are adapted to bring about a degree of granule bursting identical to a plasma gun having a power of 40 to 65 kW and generating a plasma jet in which the quantity by mass of granules injected via each injection orifice, in g/min per mm^2 of the surface area of said injection orifice, is greater than 10 g/min per mm^2.

9. The process as claimed in the immediately preceding claim, in which the quantity by mass of granules injected via each injection orifice, in g/min per mm^2 of the surface area of said injection orifice, is greater than 15 g/min per mm^2.

10. The process for manufacturing a powder as claimed in any one of claims 5 to 9, in which said injection orifice defines an injection channel having a length at least one time greater than the equivalent diameter of said injection orifice.

11. The process as claimed in the immediately preceding claim, in which said length is at least two times greater than said equivalent diameter.

12. The process for manufacturing a powder as claimed in any one of claims 5 to 11, in which, in step b), the flow rate of granule powder is less than 3 g/min per kW of plasma gun power.

13. The process as claimed in one of claims 5 to 12, in which the granulation comprises an atomization.

14. A thermal spraying process comprising a step of thermal spraying of a powder as claimed in any one of claims 1 to 4 or manufactured as claimed in any one of claims 5 to 13.

15. A treatment chamber for semiconductors, said chamber comprising a wall protected by a coating, said coating comprising more than 99.8% of a rare earth metal oxide and/or of a hafnium oxide and/or of an aluminum oxide, as percentage by mass based on the oxides, and exhibiting a porosity of less than or equal to 1.5%, said coating being obtained by thermal spraying of a powder as claimed in any one of claims 1 to 4 or manufactured by a process according to any one of claims 5 to 13.