WHAT IS CLAIMED IS:

1. A method for manufacturing a spherical YOF-based powder, the method comprising:

(a) melting YOF-based powder by introducing the YOF-based powder into a plasma jet;

(b) manufacturing a spherical YOF-based powder by spraying the molten YOF-based droplets to a refrigerant; and

(c) removing the refrigerant after step (b) and drying the spherical YOF-based powder,

wherein in step (b), when the molten YOF-based droplets are sprayed, a separation distance from an injection outlet to a surface of the refrigerant is in a range of 400 to 600 mm.

2. The method of claim 1, wherein the refrigerant is any one or more selected from water, N_2, and Ar.

3. The method of claim 1, wherein the YOF-based powder has a formula of $Y_xO_yF_z$ (where x and z are numbers greater than or equal to y).

4. A spherical YOF-based powder manufactured by the method of any one of claims 1, 2, and 3, wherein the spherical YOF-based powder comprises YF_3 and spherical YOF particles comprising an orthorhombic structure.

5. The spherical YOF-based powder of claim 4, wherein the spherical YOF-based powder has a particle size of 10 to 60 μm.

6. A YOF-based coating layer manufactured by applying the spherical YOF-based powder of claim 4 on a substrate through an atmospheric plasma spraying (APS) method.

7. A YOF-based coating layer manufactured by applying the spherical YOF-based powder of claim 5 on a substrate through an atmospheric plasma spraying (APS) method.

8. The YOF-based coating layer of claim 6, wherein the content of F in the YOF-based coating layer is 20% to 40% by weight.

9. The YOF-based coating layer of claim 6, wherein the YOF-based coating layer has a porosity of less than 2%.