Claims

1. A wear-resistant and corrosion-resistant iron-based alloy powder for laser cladding, comprising the following components in mass percentages: C: 2.6-3.0%, Cr: 29-31%, Ni: 8.3- 8.5%, V: 7.5-8%, Ti: 1.6-1.8%, Fe balance, the total mass of each component is 100%; a sphericity of the iron-based alloy powder is greater than or equal to 90%, a particle size distribution is 15-65μm, and a fluidity is 32-41s/100g.

2. A wear-resistant and corrosion-resistant laser cladding layer, prepared by using any one of the iron-based alloy powders of claims 1, and comprising:

(1) screening and purifying the iron-based alloy powder, a sphericity of the iron-based alloy powder is greater than or equal to 90%, a particle size distribution is 15-65μm, and a fluidity is 32-41s/100g;

(2) grinding used to remove oxide layer and oil on a surface of shaft work piece, and a cladding area of the work piece is 0.414m^2;

(3) laser cladding used to prepare the cladding layer on the surface of the work piece in step (2), the laser used is a semiconductor laser, process parameters are: laser power 2100W, spot diameter 1mm, scanning line speed 55m/min, powder feeding rate 35g/min; and

(4) performing final finishing on the work piece obtained in step (3) on a five-axis CNC machine tool according to a part drawing, to obtain a wear-resistant and corrosion-resistant laser cladding layer.

3. The laser cladding layer according to claim 2, wherein the laser cladding layer has a corrosion resistance up to level 9 of the national standard (GB/T6461-2002), a hardness of 61HRC～63HRC, and a yield strength of 1700～1900MPa.