Claims

1. A method of preparing a ceramic heating element, wherein the preparation method comprises the following steps:

Step 1: Preparation of alumina ceramic sludge: adding 0.01-0.05 parts (by weight) of magnesium nitrate, 0.01-0.05 parts of zirconium oxychloride, 0.01-0.05 parts of yttrium nitrate, 1.5~2.5 parts of oleic acid, 1~2 parts of lubricant, 3~15 parts of binder and 10~30 parts of deionized water into 100 parts of nano alumina powder, putting them into a mixing machine, and mix them for 1~ 5h at a temperature below 30℃, thus to prepare the alumina honeycomb ceramic sludge with uniform distribution and a solid content of 75-85% for later use;

Step 2: Molding of alumina honeycomb ceramics: adding the alumina honeycomb ceramic slurry prepared in step 1 into a screw-type ceramic extrusion molding machine with a vacuum degassing device, and extruding hollow, thin-wall honeycomb ceramic blanks out of the ceramic slurry through the die head as pushed by the screw;

Step 3: Drying of alumina honeycomb ceramic blanks: moving the ceramic blanks prepared in step 2 to an oven, make them dry and dehydrate for 5 to 10 minutes under 40 -50°C hot air, thus to obtain a ceramic green body with satisfactory appearance and straightness;

Step 4: Debinding of the alumina ceramic green body: biscuiting the ceramic green body prepared in step 3 at 1100-1200°C to obtain a biscuit ceramic;

Step 5: Firing of alumina honeycomb ceramic: placing the biscuit ceramic prepared in step 4 in a high-temperature molybdenum tube and firing it in a hydrogen atmosphere or directly in the air at 1600-1800°C to obtain an alumina honeycomb ceramic;

Step 6: Preparation of alumina honeycomb ceramic surface heating printed circuit and its wire: print a thick-film electric heating wire on the outer surface of the alumina honeycomb ceramic prepared in step 5 using screen printing technology, after the printed circuit is dried up, apply silver solder on a bonding pad to stick the wire, dry them up in the oven again, and then move them to a furnace for sintering at 800°C-1500°C, thus to obtain an integrally sintered wire and printed circuit, and simultaneously, complete silver soldering of the wire in the furnace.

2. The method of claim 1, wherein the nano alumina powder used in step 1 has a purity of 99.99% or above, a particle size of 350 nm, and a specific surface area of $7m^2/g$.

3. A ceramic heating element as claimed in claim 1, comprising:

a honeycomb ceramic body, wherein porous channels are arranged in the honeycomb ceramic body, and the porous channels are circular holes or polygonal holes;

a heating printed circuit, wherein the heating printed circuit is arranged around the outer surface of the honeycomb ceramic body to heat the air passing through the porous channels;

wherein the porous channels are uniformly distributed in the honeycomb ceramic body;

wherein the porous channels are arranged in the center of the honeycomb ceramic body;

wherein, the honeycomb ceramic body is a cylinder with a circular or polygonal cross section.

4. The ceramic heating element of the claim 3, wherein the alumina ceramic tube body is an alumina honeycomb ceramic body, and the alumina honeycomb ceramic body has a density being not less than 3.86 g/cm^3.

5. An air-heating type heat not burn heating device, comprising:

a ceramic heating element of claim 3;

a preheating device, wherein the ceramic heating element is arranged below the preheating device.

wherein preheating device comprises a preheating tube, a deflector is arranged between the preheating tube and the ceramic heating element, and a plurality of guide holes are arranged on the deflector;

wherein the preheating device comprises a thin-wall alumina ceramic tube for preheating, a cavity in the center of the thin-wall alumina ceramic tube is used for placing smoking product;

an opening at one end of the thin-wall alumina ceramic tube and a base plate forms a cup body, and a plurality of hot air flow holes are arranged on the base plate.

6. The air-heating type heat not burn heating device of the claim 5, wherein the ceramic heating element and the preheating device are arranged in a sealing sleeve.

7. The non-contact air-heating type heat not burn heating device of the claim 5, wherein the thin-wall alumina ceramic tube body has a density not less than 3.86 g/cm^3.

8. The air-heating type heat not burn heating device of the claim 5, wherein a plurality of hot air flow holes are uniformly arranged around a virtual circle in the center of the base plate, and the hot air flow holes are circular holes with a diameter ranging from 0.1mm to 2 mm.

9. The air-heating type heat not burn heating device of the claim 5, wherein the base plate is made of high-purity alumina ceramics.