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°C, 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 $7m^2/g$.