



Metal materials microwave sintering Research Status

Abstract: Microwave Sintering is a new sintering technology in recent years, extensive research has been in the metal, ceramic and composite materials have been used widely. In response to microwave sintering of metallic materials in the country, outside of the research status of microwave sintering characteristics of metallic materials and some of the more typical application example in the field of metal material for a more comprehensive introduction; and finally the application of microwave sintering were prospects and outlook. noted some shortcomings of the technique in the preparation of the metal present in the material.

Keywords: microwave sintering; metal materials; Features; Cermet rods /strips, ZrC powder, NbC powder, Cr₃C₂ powder, VC powder, TaC powder, TiC powder, HfC powder,...), compound carbide powder etc.

Introduction

Microwave sintering is developed rapidly in recent years, a new heating sintering technology. It differs by conduction, radiation and convection heat transfer mechanism to force a conventional heating sintering method. It is the use of microwave band and the basic structure of a special synthetic material disaster heat generated by dielectric loss material such that the material as a whole is heated to the sintering temperature to achieve densification. Has a low sintering temperature, sintering cycle is short, low energy consumption, environmentally friendly features, in line with current trends in the development of green industries. 1960s, Tinga first applied in the preparation of ceramic materials in the microwave sintering technology, at the same time, research on the dielectric properties of the material to get a breakthrough, which laid the theoretical foundation for the application of microwave sintering. Subsequently, the outbreak of the world's energy crisis, scholars from various countries to promote further research on microwave sintering technology, so far, microwave sintering technology has been successfully applied to the preparation of a variety of ceramic materials, metals and composite materials. In early studies, it is generally considered a bulk metal will reflect the microwave, and has a plasma discharge and arc discharge phenomena, so prepare microwave sintering technology can not be used. 1980s Walkewicz at 2.4 GHz frequency microwave field in the six kinds of metal powder is heated in the temperature, but he did not carry out Sintering, although later Whittaker will be highly exothermic microwave sintered metal powder is mixed with sulfur, the synthesis of metal sulfide, but the microwave sintering metal powder in the subsequent long period of time have not been mentioned. 1999 US Professor Roy break through the traditional view, the first successful microwave sintering of powder metallurgy of iron, copper, nickel, cobalt, tungsten, iron and copper, iron, nickel aluminum bronze and other metals or alloys, within the worldwide caused great repercussions. many people regard the past 10 years had a strong interest and a lot of research, making microwave sintering technology in the application of metallic materials has gradually become a hot research topic in the field of powder metallurgy sintering specialty. In the 21st century, people increasingly pay attention to environmental and resource issues, microwave sintering technology will be subject to more extensive research and application, the technology has been known as the "21st century generation of sintering technology." In order to provide reference to relevant research. The authors research status microwave sintering of metal materials were reviewed, and combined with its features and some of the more typical examples of a more full and presentation.