T16-087

Tohoku University's Invention

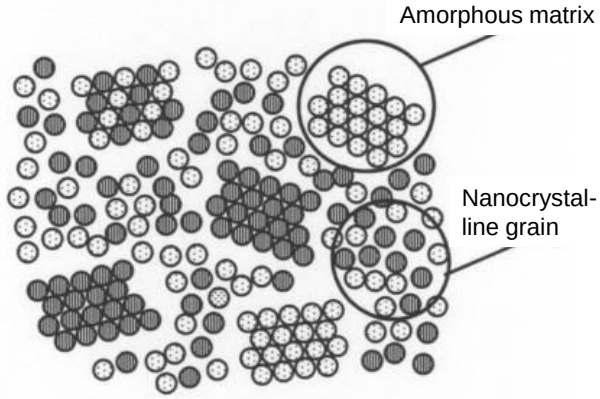
Amorphous nanoparticles, production method and dispersion

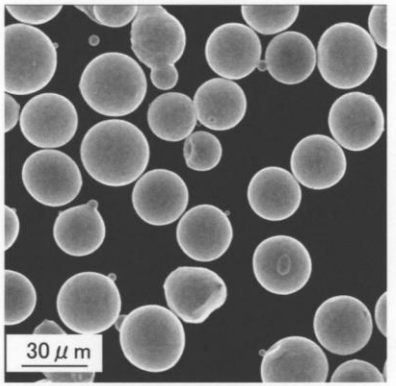
Easy production of well-dispersed amorphous nanoparticles at low temperature

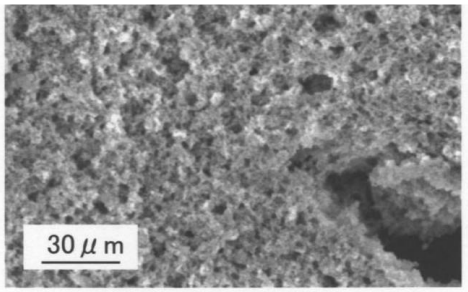
Summary

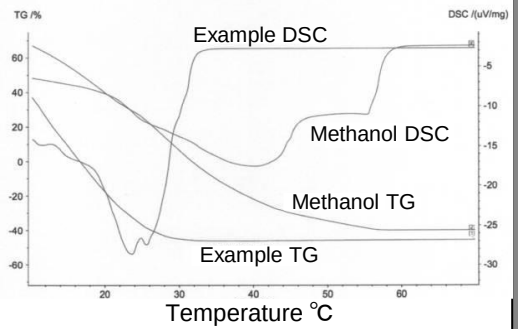
Liquid quenching method and atomization method are known as conventional methods of producing amorphous particles. However, the amorphous particle size obtained by these methods is relatively large and it has been difficult to obtain nanometer order amorphous nanoparticles, including amorphous tissue. Although chemical and arc plasma discharge methods are known to produce metal nanoparticles, the application of those methods are not easy due to the formation of secondary particles and segregation. Furthermore, it is also difficult to obtain large quantities of nanoparticles.

This invention is able to provide amorphous nanoparticles, its production method with excellent dispersibility at relatively low temperatures, and amorphous nanoparticle dispersions. This invention includes the process of obtaining a dispersion with a solid-state metal comprising an alloy and a reducing dispersant, and the process of irradiating the dispersion with ultrasound in order to obtain amorphous nanoparticles containing an amorphous structure from the solid-state metal.









【Up left】Conceptual diagram of the amorphous nanocrystal structure
【Up right】Scanning electron micrograph of Sn-Bi alloy powder
【Down left】Scanning electron micrographs of amorphous nanoparticles
【Down right】Results of thermogravimetric and differential scanning calorimetry of methanol dispersion and methanol

Effect

- High dispersible amorphous nanoparticles easy production at low temperature
- The agglutination of the particles is avoided and their thermal properties is not changed even after a long period of time

Application

● "Nano-solder" which is a nano size solder

Patent Data Sheet

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