

## Preparation for Fibroid and Spherical Superfine Cobalt Powder by Recycle Technology

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### Abstract

Using the cobalt waste recycled from battery, alloy, electroplate trade, such as industry rubbish, waste cells and tools etc, fibroid and spherical superfine cobalt powder would be prepared by recycle technology. Say, aforementioned cobalt waste would be synthesized into particular shape cobalt compound precursor through dissolving, purifying, atomization-hydrolyzing. Then in much section temperature and many kinds of atmosphere these precursor would be deoxidized into superfine cobalt powder with a 0.5~1.5um particle size. This craft is environment friendly. The fibroid and spherical cobalt powder is suitable for the manufacture of the high-power nickel battery and high-performance hard-alloy.

## Effect of Atmosphere on Synthesis of TiB<sub>2</sub> Particles by Carbothermal Reduction

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### Abstract

The carbothermal reduction synthesis process of titanium diboride (TiB<sub>2</sub>) particles was studied. In the synthesis of TiB<sub>2</sub> using carbothermal reduction from a mixture of TiO<sub>2</sub>, B<sub>2</sub>O<sub>3</sub> and carbon, solid-solid reactions are involved. TiO<sub>2</sub> particles rapidly react with carbon to TiC, which then reacts with boron oxide and carbon to TiB<sub>2</sub>. In the vacuum condition, TiB<sub>2</sub> particles were formed at temperature of 1300°C for 10 min. It seems that a high exothermic reaction eventually led to the increase of reaction rate. In flowing argon atmosphere, TiB<sub>2</sub> particles were formed at temperature of 1550 °C for 0 min and it was shown finer particle size than that in the vacuum condition because of the faster heat elimination due to the flowing argon. In high atmospheric pressure of argon gas such as 20 atm in reaction or cooling state, the synthesized TiB<sub>2</sub> particles shows a mixture of diverse sized particles.