

## VLS growth of ZrO<sub>2</sub> nanowhiskers using CVD method

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Ceramic is widely known material due to its outstanding mechanical property. Besides, Zirconia(ZrO<sub>2</sub>) has a low thermal conductivity so it is advantage in a heat insulation. Because of these superior properties, ZrO<sub>2</sub> is attracted to many fields using ultra high temperature for example vehicle engines, aerospace industry, turbine, nuclear system and so on. However brittle fracture is a disadvantage of the ZrO<sub>2</sub>. In order to overcome this problem, we can make the ceramic materials to the forms of ceramic nanoparticles, ceramic nanowhiskers and these forms can be used to an agent of composite materials.

In this work, we selected Au catalyzed Vapor-Liquid-Solid mechanism to synthesize ZrO<sub>2</sub> nanowhiskers. The ZrO<sub>2</sub> whiskers are grown through Hot-wall Chemical Vapor Deposition(Hot wall CVD) using ZrCl<sub>4</sub> as a powder source and Au film as a catalyst. This Hot wall CVD method is known to comparatively cost effective. The synthesis condition is a temperature of 1100°C, a pressure of 760torr(1atm) and carrier gas(Ar) flow of 500sccm. To observe the morphology of ZrO<sub>2</sub> scanning electron microscopy is used and to identify the crystal structure x-ray diffraction is used.

**Keywords:** zirconia, ZrO<sub>2</sub>, nanowhisiker, CVD