

Materials Technology

Title

Synthetic tanzanite and its fabricating method

Abstract

Tanzanite is the top ten valuable and the top ten rarest gemstones in the world since it is a thousand times rarer than diamonds. The price per carat rises to US\$900 in 2022. This high demanded precious stone has no literature on its fabrication, though. Therefore, the solvothermal method was carried out to synthesize tanzanite under specific temperature, pressure and pH value with those reactant contained calcium, aluminum, silicon and vanadium compound. Result shows that the total cost of reactant and energy consumption for a single experiment is NT\$113.56, and about 65% yield (5.56 grams) of tanzanite crystals can be produced. As the advantage of low cost, maximum particle size around 0.6 mm can be used as the seed crystal for mass production in the future.

Benefits

1. The first synthetic technology of tanzanite crystal.
2. The reaction time is much shorter compared to the natural tanzanite crystals
3. Artificial tanzanite technology can avoid the problem of supply and demand after natural tanzanites are exhausted.
4. The reaction conditions used in this synthetic process can effectively solve the toxicity, high-temperature and high-pressure, pH value and redox properties.

Industry Categories

Gemstone · Epitaxial crystal growth · Optoelectronic fields

Keywords

Tanzanite · natural veins · geology and petrology

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