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Abstract
This thesis is to study on the preparation of silver nano-particles by thermal evaporation method, and control the size of particles with various inert gas pressure. The advantages include those high yield, high purity. low cost, and simple control of particle size by adjustment of inert gas pressure. It is revealed that inert gas pressure plays important role on the preparation of nano-particles.
The morphology, structure, composition, and optical properties of nano-particles are studied by Ultraviolet-Visible spectrophotometer (UV/Vis spectrophotometer), transmission electron microscopy (TEM), and X-ray diffraction (XRD). Eventually, the electrical properties of nano-particles was investigated by using four point probe meter. A serial of sample can be analyzed to understand the special phenomenon.
According to the experimental results, the particle size became smaller with increasing inert gas pressure. Nevertheless, the particle size has a critical value at specific pressure, which is the stable condition to grow the smallest particle size. But, the inert gas pressure exceeded specific pressure, the particle size can’t be continue to became smallest one, and the condition of growth is unstable. The absorption spectra of the particles exhibit red shift when the size of particles become smaller. The silver nano-particles are clearly confirmed by X-ray diffraction and TEM analysis. The electrical properties of nano-particles at the range of temperature from 250K to 300K has a fluctuational phenomenon .
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