

CHAPTER 4

CONCLUSIONS

The structure of $\text{Cu}_{0.5}\text{Ag}_{1.5}\text{InSe}_3$; CAIS was simulated from face-centered structure of Cu_2GeSe_3 (space group: $I42d$). CAIS was prepared by sol-gel method.

The atmosphere of preparing method and annealing method affected the structure of CAIS. Since, metal oxide easily occurred in air atmosphere. So, CAIS can prepare in only nitrogen atmosphere. In addition, mole ratio affected the structure of CAIS. The appropriate ratio was metal precursor: solvent: stabilizer: water was 1: 40: 2: 1. The pH variation was not affected the gelation process of CAIS gel.

CAIS gel was found in condition 1 hour for drying and 1 hour annealings at 300°C by using XRD, SEM-EDS and TEM techniques to confirm. XRD results showed the same diffraction pattern with simulated data. SEM-EDS techniques showed the percent of elements and particle morphology of each element. TEM techniques confirmed diffraction pattern of CAIS.

The electrical conductivity of CAIS was $1.82 \times 10^{-3} \text{ ohm}^{-1} \cdot \text{cm}^{-1}$ and seebeck coefficient at room temperature was 0.99 uV/K . Both of properties confirmed that CAIS prepared by sol-gel method can be used as thermoelectric material because of its properties.