

# Effects of Zn Substituted on the Structure of Hydroxyapatite Synthesized from Waste Chicken Egg Shells



C. Paikaew<sup>1</sup>, P. Limsuwan<sup>1</sup>, E. Hoonnivathana<sup>2</sup>, W. Kaewwiset<sup>3\*</sup> and K. Naemchanthara<sup>1</sup>

<sup>1</sup>Department of Physics, Faculty of Science, King Mongkut's University of Technology Thonburi.

<sup>2</sup>Department of Physics, Faculty of Science, Kasetsart University.

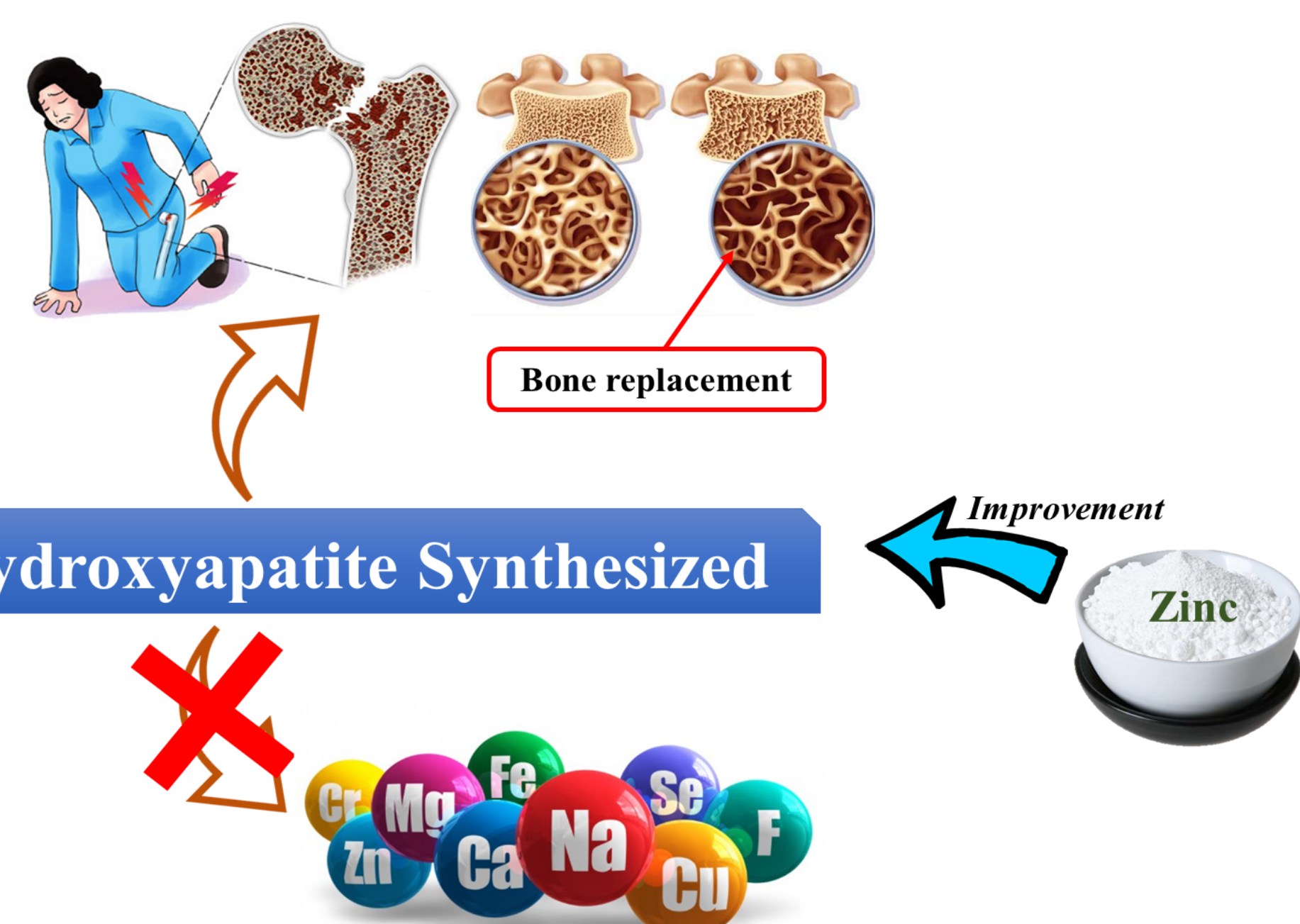
<sup>3</sup>Department of Physics, Faculty of Liberal Arts and Science, Kasetsart University, Kamphaengsaen Campus.

\*Corresponding author. E-mail: faaswnka@ku.ac.th

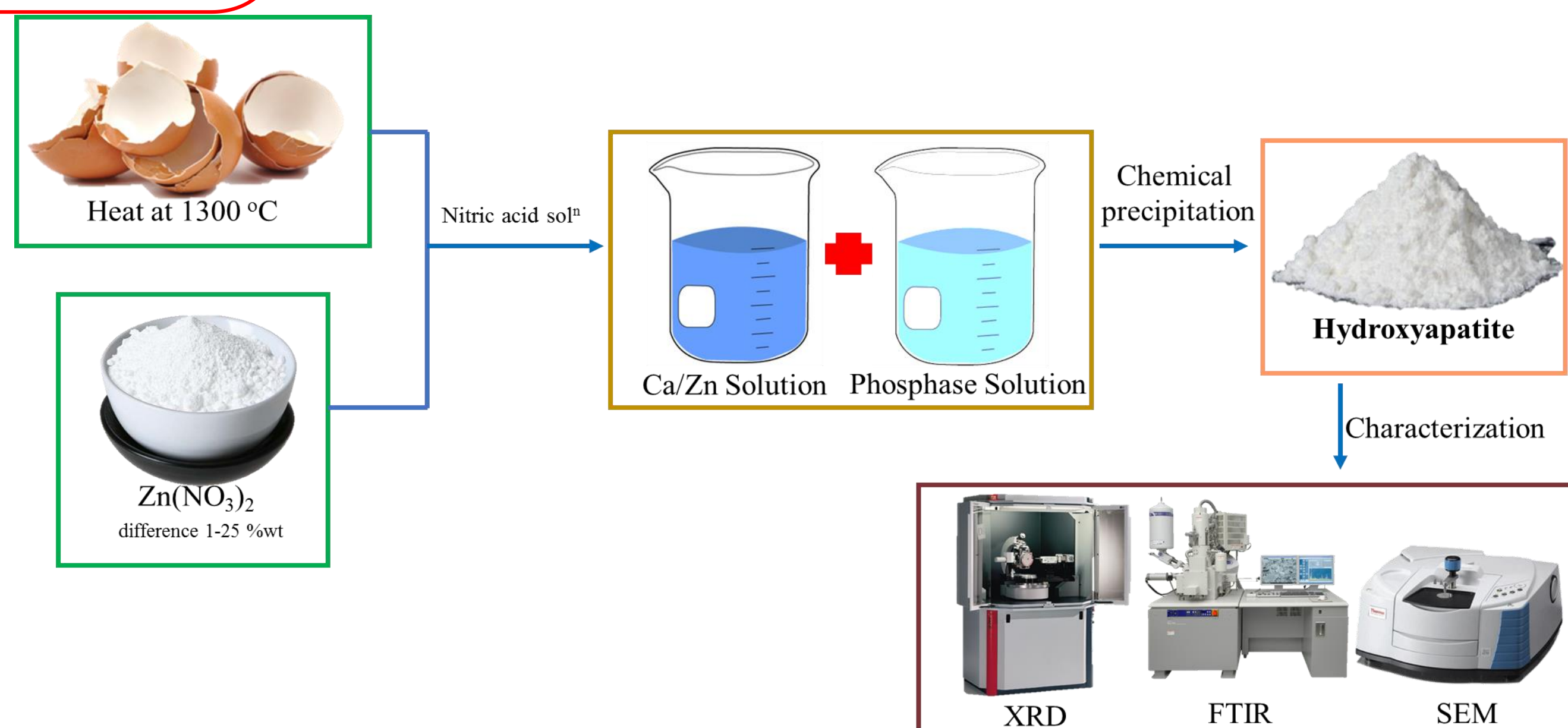
## Abstract

In this research, Zn substituted Ca hydroxyapatite synthesized from waste chicken eggshells were prepared precipitation method. The structure properties and morphology were investigated by X-ray diffraction (XRD), Fourier transform spectroscopy (FTIR) and scanning electron microscopy (SEM). The results showed that the intensity of XRD pattern and crystallite size of hydroxyapatite decreased with increasing Zn concentration and function groups of hydroxyapatite and Zn were confirmed by FTIR. The phase structure of hydroxyapatite was not changed. Zn addition into hydroxyapatite from 1 to 25 % weigh. The SEM images show that the particle size of hydroxyapatite reduced with increasing Zn concentration. The experimental results indicated that the Zn can be substituted Ca hydroxyapatite by precipitation method.

## Introduction

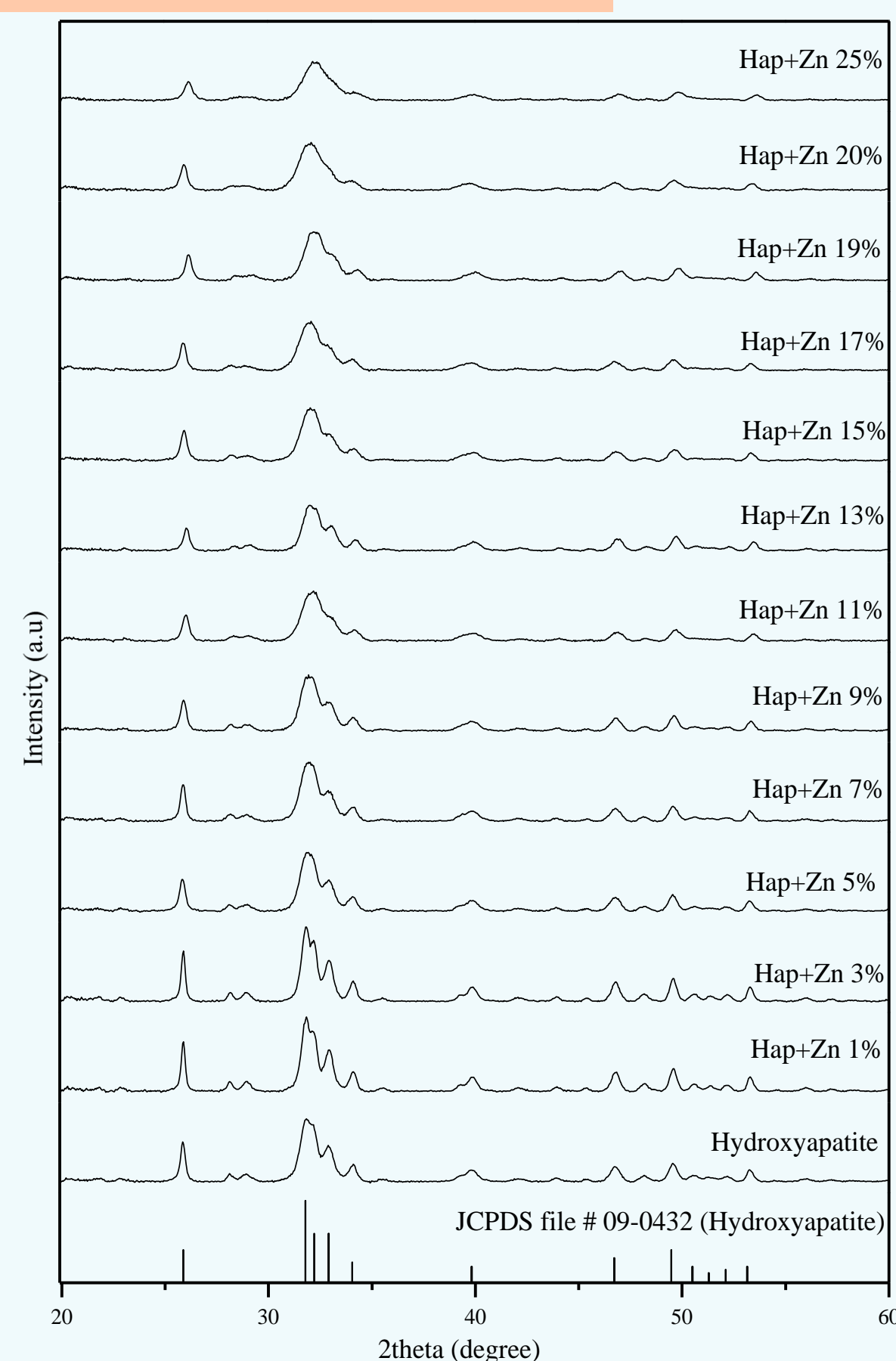


## Experiment

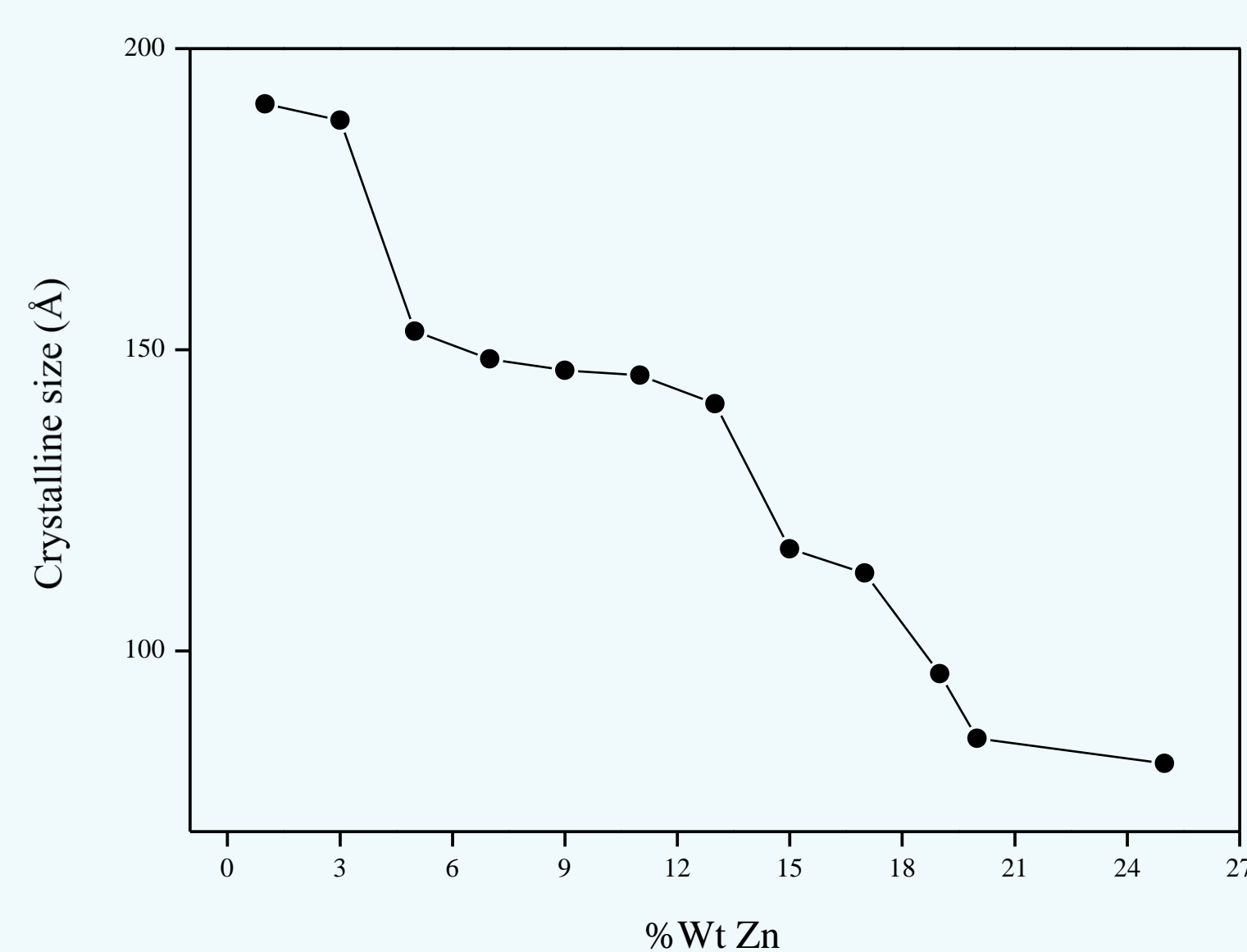


## Results & Discussion

### X-ray Diffraction



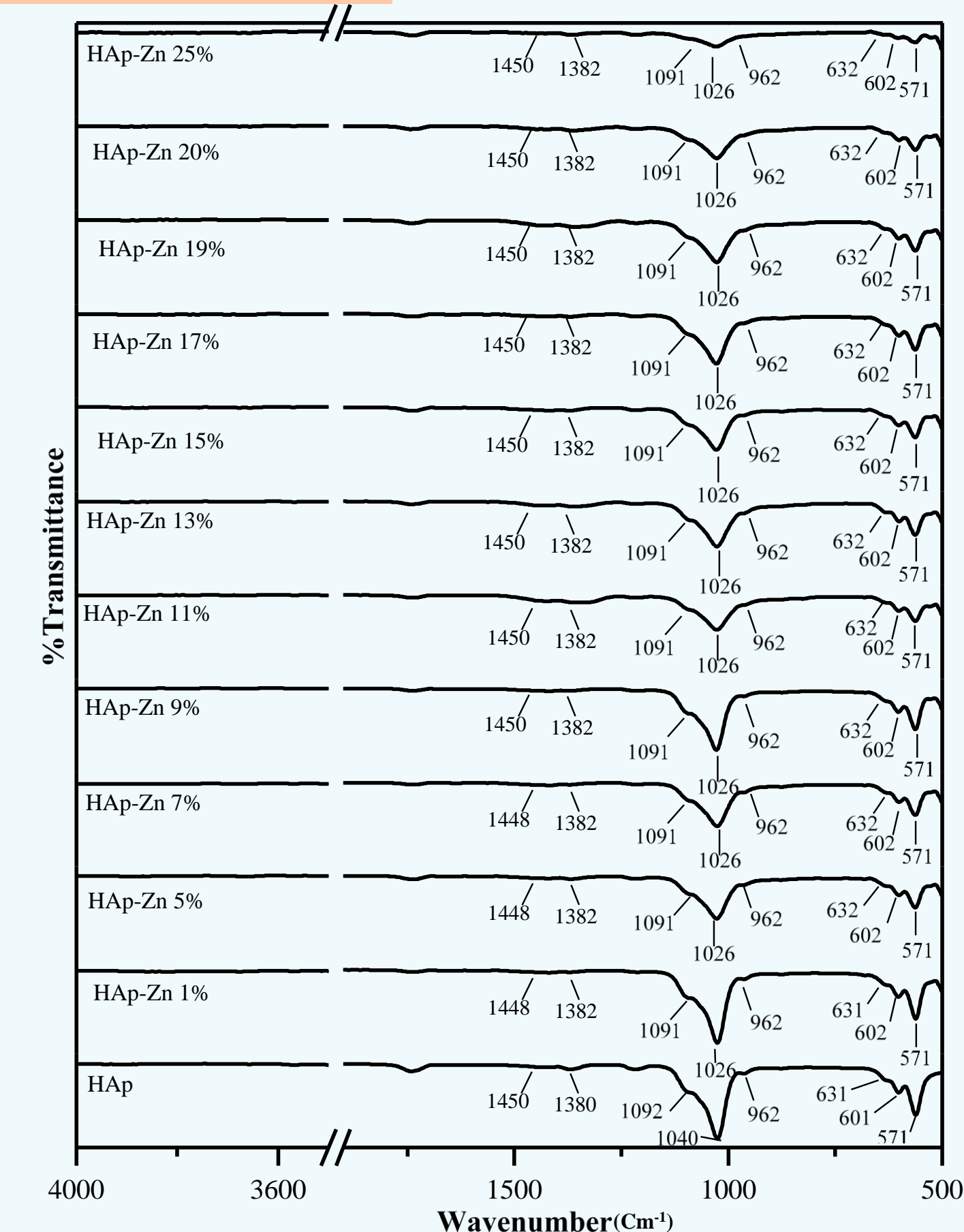
Figures 1. Show (of hydroxyapatite doped Zn at difference percent weights.



Figures 2. crystallite size of hydroxyapatite doped Zn at 1-25 %weight.

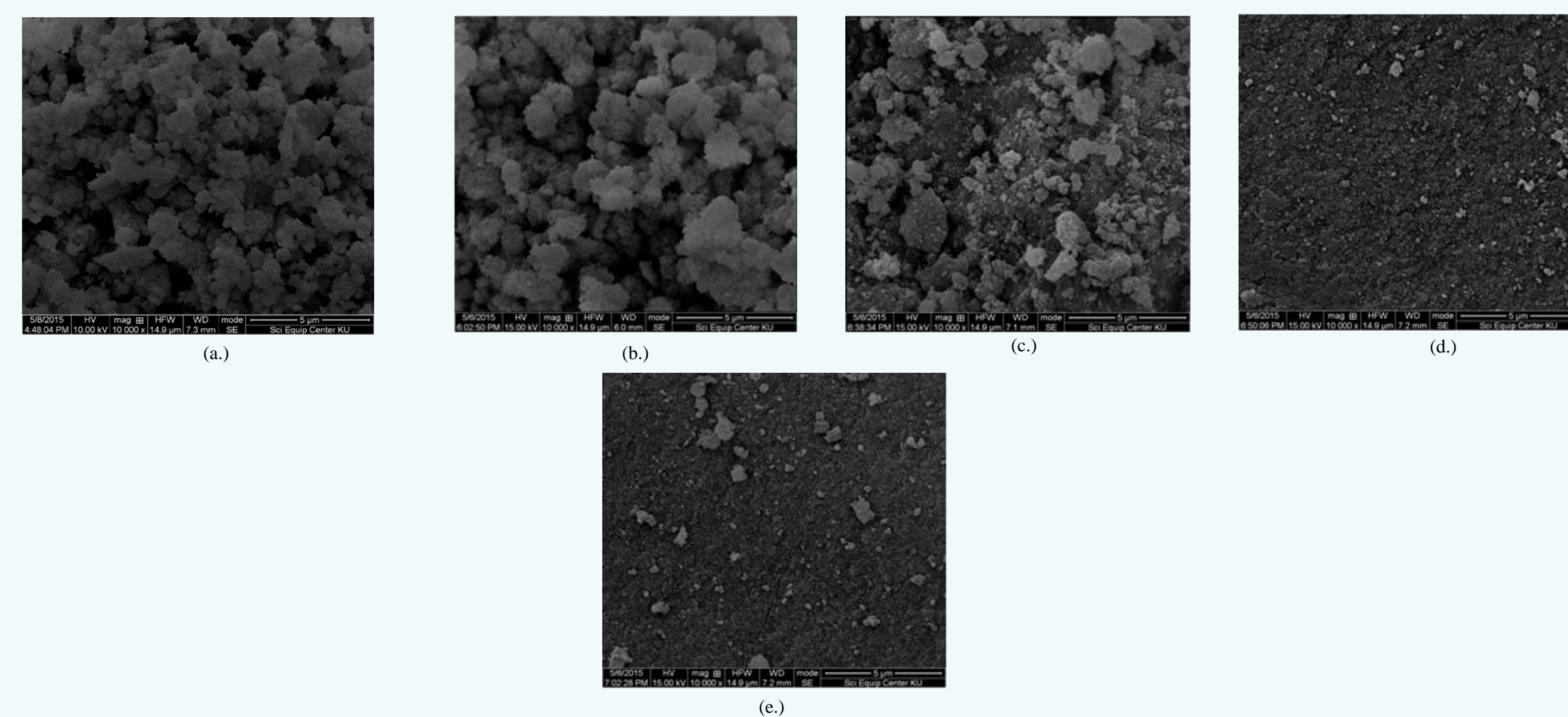
## Results & Discussion

### Fourier Transform Infrared Spectroscopy



Figures 3. FTIR spectra of hydroxyapatite doped Zn at 1-25% weight

### Scanning Electron Microscopy



Figures 4. SEM micrograph of the samples with different Zn fraction. (a.) hydroxyapatite (b.) Hap+Zn 1% (c.) Hap+Zn 19% (d.) Hap+Zn 20% (e.) Hap+Zn 25%

## Conclusion

The hydroxyapatites from chicken egg shells doped Zn at different concentrations were synthesized by precipitation method. The  $\text{Ca}^{2+}$  ion of produced powder was substituted by  $\text{Zn}^{2+}$  ion and hydroxyapatite crystal structure were decreased with increasing Zn concentration while hydroxyapatite phase had stilled. The experiment shows that the Zn can be doped into the hydroxyapatite completely.

## Acknowledgements

The authors gratefully acknowledge the support given to this work by Faculty of Science, King Mongkut's University of Technology Thonburi and Kasetsart University. The authors would like to sincere thanks to Thailand institute of nuclear technology (TINT) provided X-ray diffraction for experiment.

## References

1. P. Pankaew, E. Hoonnivathana, P. Limsuwan and K. Naemchanthara, "Temperature Effect on Calcium Phosphate Synthesized from Chicken Eggshells and Ammonium Phosphate", Journal of Applied Sciences 10 (2010) 3337-3342.
2. G. Devanand, S. Rammasamy, V. Ramakrishnan and J. Kumer, "Nanocrystalline hydroxyapatite and zinc-doped hydroxyapatite as carrier material for controlled delivery of ciprofloxacin.", 3 Biotech Springer (2011) 173-186.