22nd Iranian Chemistry Conference, 23-25 August, 2023
University of Kurdistan

New Zinc(II) Mixed Ligand Coordination Polymers at Nano and Bulk Size, Precursor for Preparation of ZnO Nanoparticles

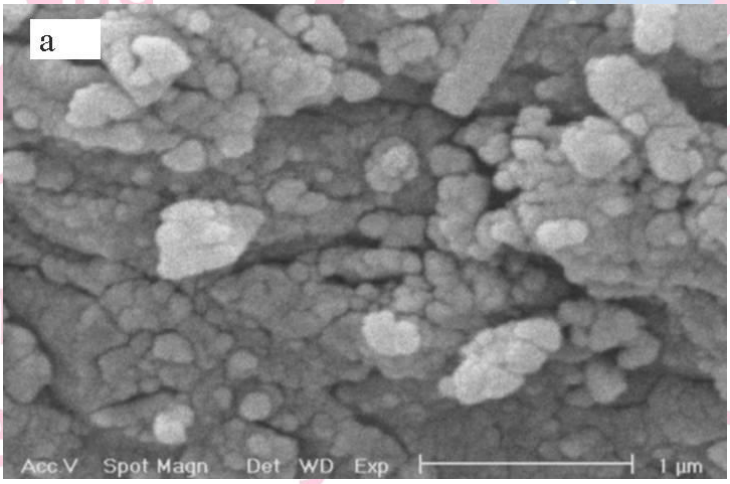
Seyid Javad Musevi[a] and Alireza Aslani[b]

[a]*Department of Chemistry, Shahid Beheshti Technical Faculty, Technical and Vocational University, Urmia, Islamic Republic of Iran*

[b]*Department of Chemistry, Faculty of Science, Ataturk University, 25240-Erzurum, Turkey*

[*] *E-mail: a.aslani@sciknow.org*

Three-Dimensional ZnII coordination polymer containing 4,4´-bipyridine (4,4´-bipy) and benzene 1,4-dicarboxilic acide (BDCA), [Zn2(μ-4,4´-bipy)(μ-BDCA)$_2$]n has been synthesized and characterized by elemental analysis, IR spectroscopy, Raman and its structures studied by single Crystal X-ray crystallography. ZnO nanoparticles were obtained by calcination of compound at 500ºC under air atmosphere and were characterized by X-Ray Diffraction (XRD), Raman spectroscopy, solid state UV and Scanning Electron Microscopy (SEM) [1-2].



Reaction between mixture of 4,4´-bipy and BDCA with a mixture of zinc(II) acetate led to formation of the new zinc(II) 3D coordination polymer [Zn2(μ-4,4´-bipy)(μ-BDCA)2]n. Nanoparticles of this Nano Coordination Polymers (NCP) were obtained by ultrasonic irradiation in a Methanol/water solution and single crystalline material was obtained using a slow evaporation

$$Zn(OAC)_2 + 4,4 - bpyr + BDCA \rightarrow$$
$$\rightarrow \begin{cases} \xrightarrow{(MeOH)\ in\ Branched-Tube} \{Single\ Crystal\ of\ [Zn_2(\mu - 4,4' - bipy)_2(\mu - BDCA)_2]_n \\ \xrightarrow{Ultrasond\ Irradiation+MeOH} \{Nanoscale\ of\ [Zn_2(\mu - 4,4' - bipy)_2(\mu - BDCA)_2]_n \rightarrow \\ \rightarrow \xrightarrow{Calcination\ at\ 500-600℃} Nanoparticle\ of\ ZnO \end{cases}$$

Keywords: Zinc(II), Coordination Polymers, Nanostructure, Mixed Ligands, ZnO

References

[1] Seyid Javad Musevi , Ertan Sahin , Alireza Aslani, *Powder Technology*, 229, **2012**, 30-36
[2] Alireza Aslani , Ali Morsali , Veysel T. Yilmaz , Canan Kazak, *Journal of Molecular Structure*, 929, 1-3, **2009**, 187-192.