

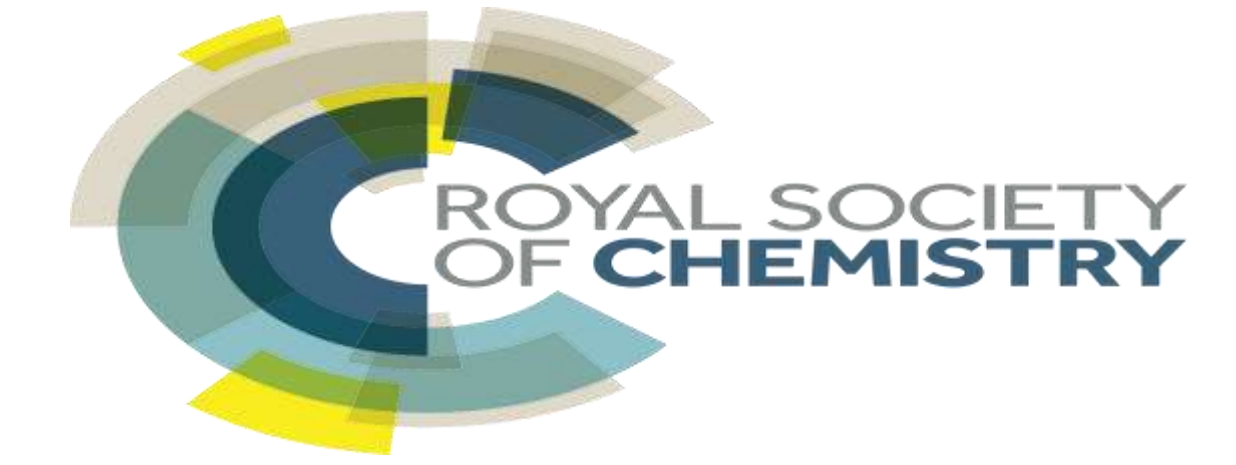


# Gold nanoparticles decorated Carrageenan and Zn Metal organic frameworks based nanobiocomposite in selective sensing of serotonin

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## Introduction

❑ Natural polysaccharides have attracted considerable attention as stabilizing platform in a variety of applications such as biomedical, supercapacitor and dietary applications.

❑ In this work, we constructed a biopolymer Carrageenan (CA), surface modified with gold nanoparticles (Au) and successfully decorated with Zn – Metal Organic Frameworks (Zn-MOF), exhibited effective role as nanobiocomposite in selective Serotonin (SER) sensing application,

## Objectives

➤ To fabricate a electrochemical sensor electrode surface using Au@CA/Zn-MOF coated on Glassy Carbon electrode (GCE).

➤ To validate the prepared biosensor in selective sensing of Serotonin (SER) by cyclic voltammetry, Square wave voltammetry .

## Experimental Procedure

➤ 0.5 g of CA dissolved in 25 mL DI water and stirred for 30 min.

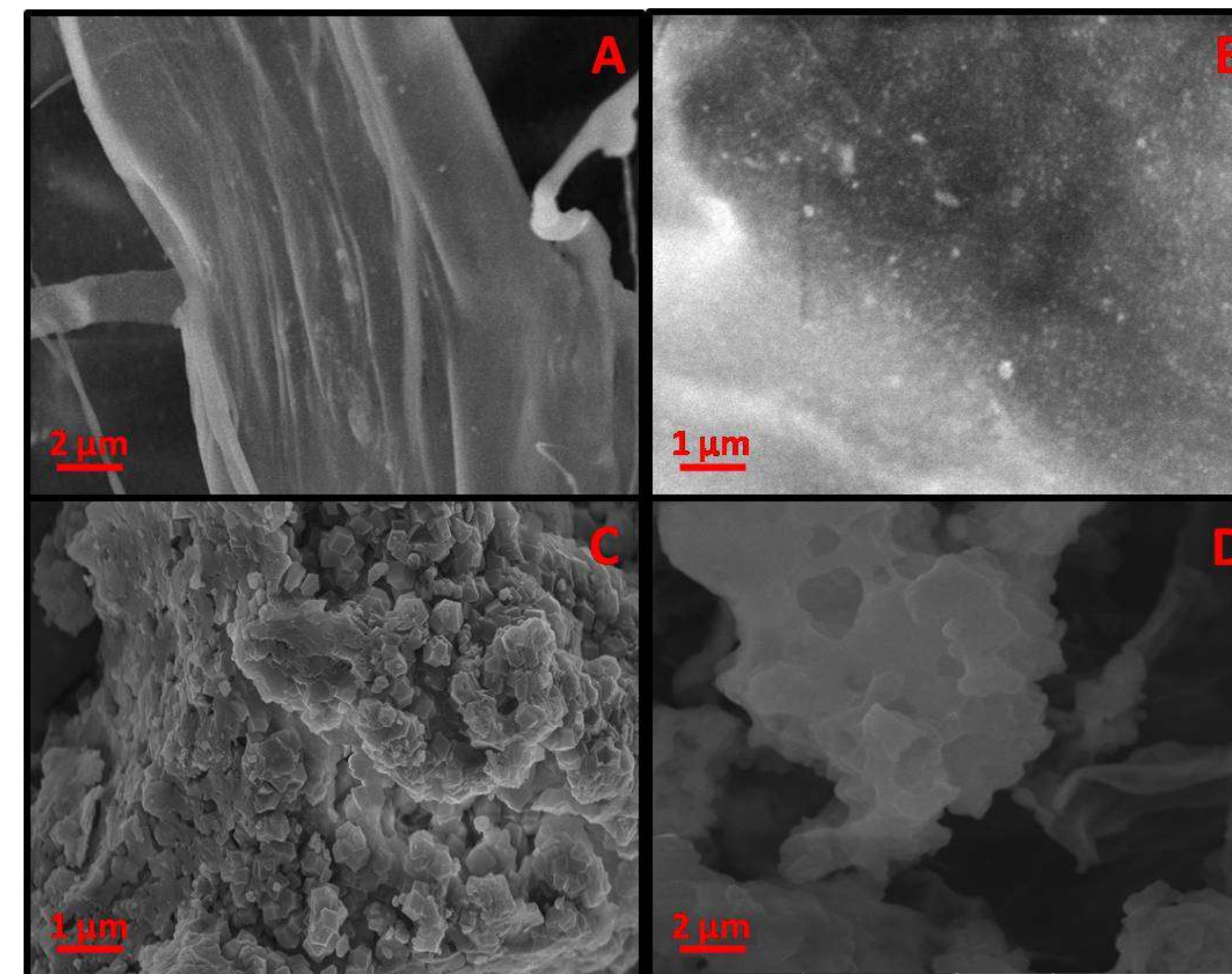
➤ In the reaction mixture, 10 mL of 0.5 mM auric acid (0.002 g) was added slowly and kept stirring for 3 h.

➤ In that, 5 mg of Zn-MOF was added and kept in stirring for 1 hour.

➤ For the reduction purpose, 5mM of NaBH<sub>4</sub> in 40 mL DI water was added into the dispersed solution.

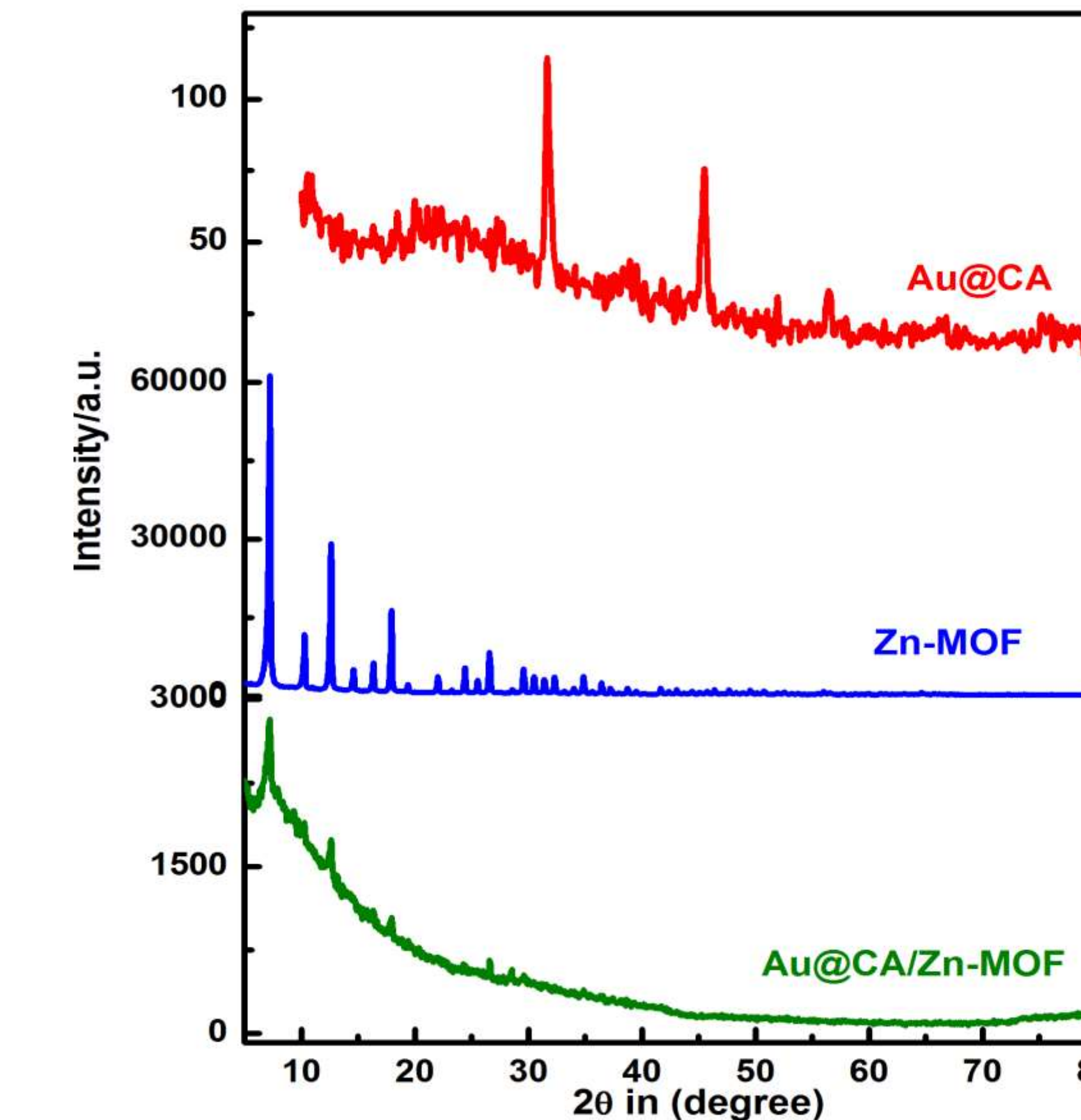
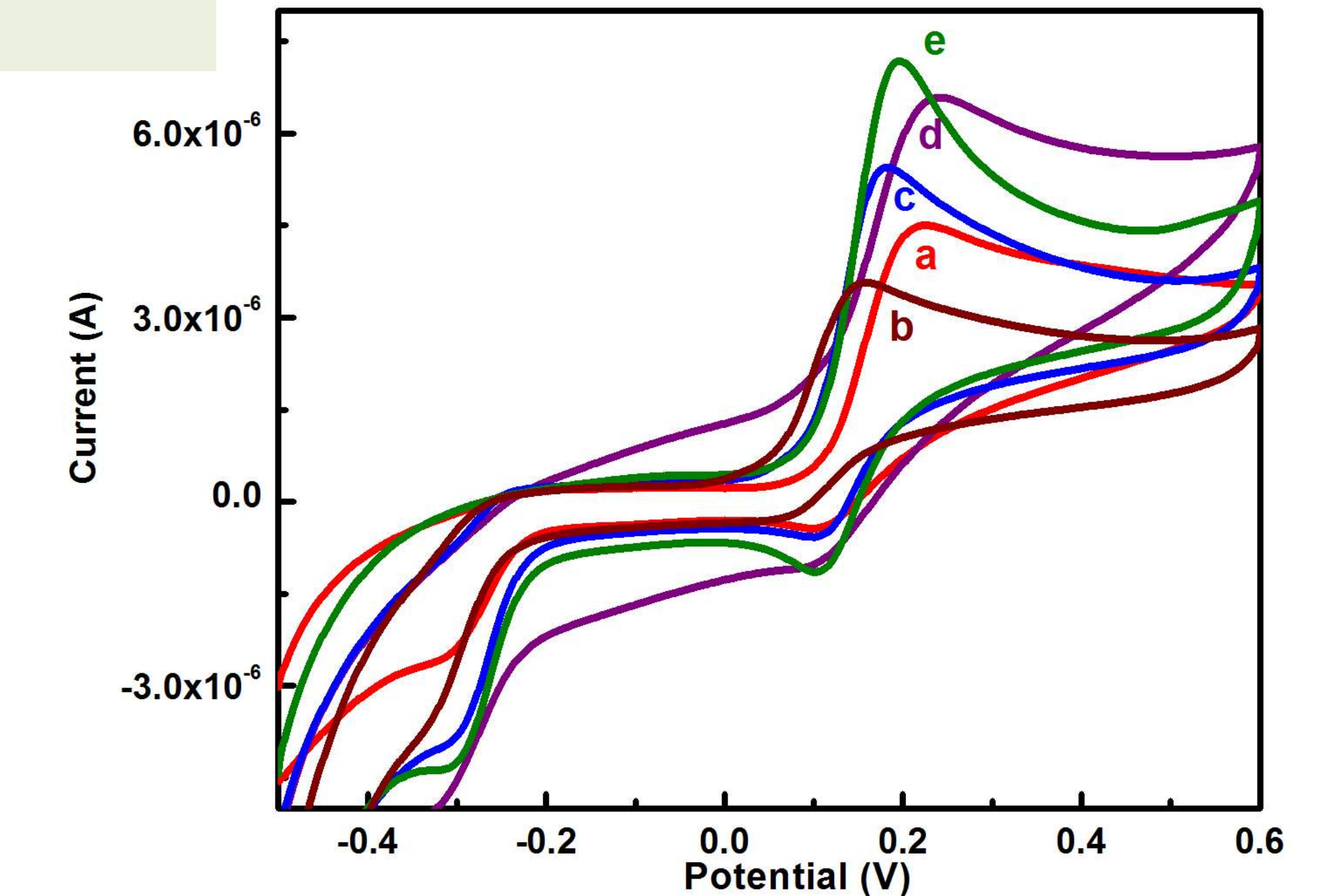
➤ The reacted polymer got separated by the addition of acetone into the mixture and the obtained final product was dried using lyophilizer.

## Results and Discussion

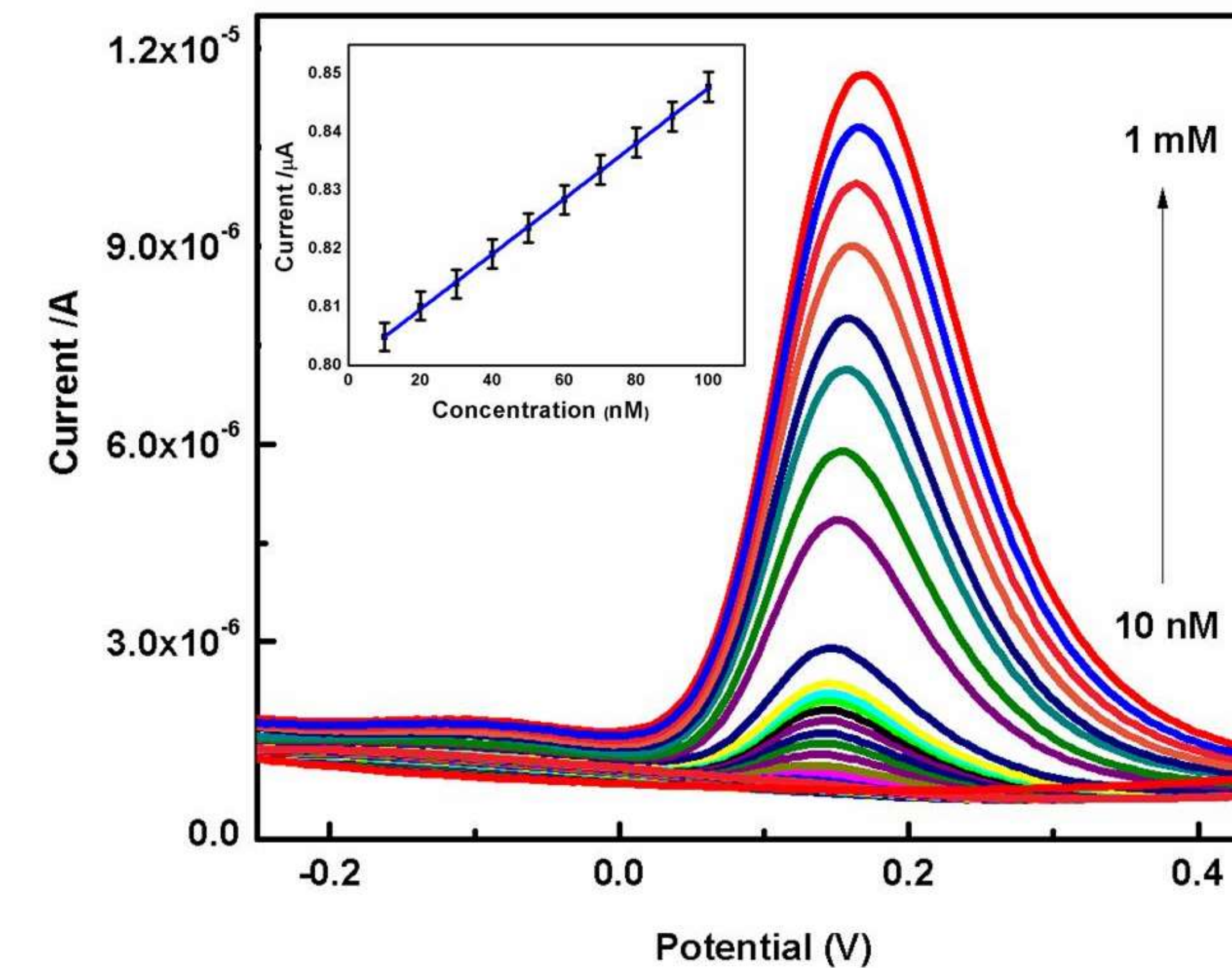


SEM of (A&B) Au@CA (C) Zn-MOF (D) Au@CA/Zn-MOF

## XRD pattern of prepared samples



CVs obtained for 200 μM of SER at the (a) bare, (b) Zn-MOF, (c) CA, (d) Au@CA, (e) Au@CA/Zn-MOF modified GCE



SWV of SER sensing for Au@CA/Zn-MOF modified GCE in 0.1 M PBS at pH 7. Inset Fig. shows the corresponding linear fit from 10 nM to 1 mM

## Summary and Conclusions

In summary, a novel nanobiocomposite was fabricated by interlinking of Au@CA and Zn-MOF and employed in biosensing application. The Au@CA/Zn-MOF modified GCE also has shown higher sensitivity towards selective sensing of SER with lower detection limit of 7 nM and wide linear range of 10 nM – 1 mM. The prepared nanobiocomposite also shown better selectivity and stability towards SER sensing.