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Name of the Department/Centre: Centre for Interdisciplinary Research in Basic Sciences

Topic of Research: Detection of Acute Myocardial Infarction using Biosensors based on Doped Metal oxide nanoparticles

Findings

The worldwide increasing cases of acute myocardial infarction have been matter of concern for researcher and scientists. The numerous steps have been adopted in few decades to diagnose AMI at early stage and provide medical aid to the patient but still limited success think us to develop a detection method. In this direction we have tried to develop electrochemical biosensors based on doped metal oxide nanoparticles for detection of AMI biomarkers Myoglobin and Troponin I. Primarily we synthesized pristine and doped ZnO, SnO₂ and TiO₂ nanoparticles with different dopants include Cu, Cr and Mn with estimated three doping fractions i.e. 13×10^{17} , 20×10^{17} , 32×10^{17} atoms/cm³ via sol-gel process. The structural and morphological characterization was carried out for each material to confirm morphological and structural information using XRD, FESEM, FTIR and UV-vis spectroscopic techniques. These synthesized nanoparticles were employed on pre-fabricated gold plated glass epoxy substrates using screen printing method. These all fabricated sensors with different nanoparticles were further used for detection of AMI biomarkers Mb and cTnI. Above findings suggest that nanostructured ZnO, SnO₂ and TiO₂ doped with Cu, Cr and Mn in lower fractions can be a potential transducing surface for fabrication of Mb and cTnI electrochemical sensor.