Contribution ID: **155** Type: **Oral**

Effect of Zr content on the structure and morphology of CrZrN thin films prepared by reactive DC magnetron co-sputtering method

In this research work, nanostructured chromium zirconium nitride (CrZrN) thin film have been deposited on Si(100) substrates by reactive DC magnetron co-sputtering method without in situ substrate heating and post-deposition annealing. The effects of Zr content, by varied the sputtering currents applied to the Zr target (Izr) in the range of 300 to 900 mA, whereas the current of Cr target was kept at 300 mA, on the structure and morphology of the as-deposited films were investigated. The crystal structure, microstructure, morphology, thickness, and chemical composition were characterized by glancing angle X-ray diffraction (GA-XRD), field emission scanning electron microscopy (FE-SEM) and energy-dispersive X-ray spectroscopy (EDS) techniques, respectively. The results shown that increasing in Izr not only enhanced the deposition rate but also increased the Zr content in the as-deposited films ranging from 3.9 to 26.5 at%. The as-deposited thin films were formed as a (Cr,Zr)N solid solution, with fcc structure in (111) and (200) plane, where Zr atoms substitute Cr atoms in the CrN lattice. The 2θ diffraction peaks were shifted to the lower value as function of Zr content which obtained by increased Izr. The as-deposited films showed a nanocrystalline structure of CrZrN with the crystal sizes less than 15 nm. The lattice parameters increased from 4.187 to 4.435 Å, whereas the crystallite size decreased from 10.4 to 8.3 nm. The FE-SEM images of all the CrZrN thin films showed compact columnar and dense morphology as a result of various the Zr content.
Moreover, the thickness of the CrZrN thin films was in the range of 302 –421 nm.

Author: Dr BURANAWONG, Adisorn (1 Department of Physics, Faculty of Science, Burapha University, Chonburi 20131, Thailand. 2 Thailand Center of Excellence in Physics (ThEP), MHESI, Bangkok 10400, Thailand.)

Co-author: Dr WITIT-ANUN, Nirun (1 Department of Physics, Faculty of Science, Burapha University, Chonburi 20131, Thailand. 2 Thailand Center of Excellence in Physics (ThEP), MHESI, Bangkok 10400, Thailand.)

Presenter: Dr BURANAWONG, Adisorn (1 Department of Physics, Faculty of Science, Burapha University, Chonburi 20131, Thailand. 2 Thailand Center of Excellence in Physics (ThEP), MHESI, Bangkok 10400, Thailand.)

Track Classification: Surface, Interface and Thin Films