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Azman, M.A.H.^a, Rashid, M.W.A.^a, Azlan, U.A.-A.^a, Shamsuri, S.R.^a, Dom, A.H.M.^a, Kasim, S.R.^b, Harttar@Mohd Hatta, M.A.M.^c

EFFECT OF MANGANESE DOPANT ON THE STRUCTURE AND ELECTRICAL PROPERTIES OF POTASSIUM SODIUM NIOBATE THIN FILM

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^a Faculty of Industrial and Manufacturing Technology and Engineering, Universiti Teknikal Malaysia Melaka, Hang Tuah Jaya, Durian Tunggal, Melaka, 76100, Malaysia

^b School of Materials and Mineral Resources Engineering, Universiti Sains Malaysia, Engineering Campus Nibong Tebal, Penang, 14300, Malaysia

^c Faculty of Engineering, International Islamic University Malaysia, Jalan Gombak, Kuala Lumpur, 53100, Malaysia

Abstract

This research paper presents a comprehensive investigation into the synthesis and characterization of manganese (Mn)-doped potassium sodium niobite (KNN) thin films with different concentration of manganese starting from 0.1%, 0.3%, 0.5%, 0.7% and 0.9% prepared via the sol-gel method. The introduction of Mn dopants with different concentrations into KNN thin films offers a pathway to further enhance their performance. The Mn-doped KNN thin films were synthesized using the chemical solution deposition method, a versatile technique known for its ability to produce uniform, high quality films. X-ray diffraction (XRD) analysis was employed to investigate the crystalline structure of the Mn-doped KNN thin films. The XRD analysis results show that the fabrication of Mn-doped KNN thin films exhibit an orthorhombic crystal structure. XRD peaks show that the occupancy of KNN thin films which indicate the synthesis was successfully done. Field-emission scanning electron microscopy (FESEM) was employed to examine the surface morphology and microstructure of the thin films. 0.5% Mn-doped KNN thin films show the best result of a uniform grain size and dense grain growth. The electrical properties of the Mn-doped KNN thin films were evaluated through resistivity measurements. Resistivity analysis showed that 0.3% Mn-doped KNN thin films have the lowest resistivity among the other concentrations. © 2024, Microscopy Society of Malaysia. All rights reserved.

Author Keywords

doped; KNN; manganese; structural; thin film

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Correspondence Address

Rashid M.W.A.; Faculty of Industrial and Manufacturing Technology and Engineering, Hang Tuah Jaya, Durian Tunggal, Malaysia; email: warikh@utem.edu.my

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