ABSTRACT

The alternating layer arrangement in 2H-MoS_2 significantly influences its piezoelectric effect, limiting its activity only to monolayer or odd-numbered layer structures. To overcome this limitation, the introduction of Ni(II) can induce structural defects that enhance its piezoelectric performance. In this study, Ni(II)-doped MoS_2 was synthesized via a hydrothermal method and characterized using X-ray Diffraction (XRD), Scanning Electron Microscopy with Energy Dispersive X-ray Spectroscopy (SEM-EDX), and Gas Sorption Analysis (GSA). The results confirmed that Ni(II) was successfully incorporated substitutionally by replacing Mo(IV) and was also intercalated between MoS_2 layers. The piezoelectric performance of Ni(II)-doped MoS_2 was evaluated based on its degradation efficiency towards New Fuchsin. At doping concentration of 3 wt%, the material achieved a degradation efficiency of 93.34%, a significant improvement compared to undoped MoS_2, which exhibited only 23.85%.

Keywords: *piezoelectric, MoS_2, nickel doping, defect, degradation, hydrothermal*