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Fabrication and Study the Characterization of BaO/p-Si Heterojunction Photodetector

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Abstract : Barium oxide thin films was deposited by chemical spray pyrolysis (CSP) at 450 °C substrate temperature and different thickness (50,74, 91, and 103) nm on the texturized p-Si wafer to fabricate BaO/p-Si heterojunction photodetector. Structural, electrical and photovoltaic properties are investigated for the samples. XRD analysis reveals that all the as deposited BaO films show polycrystalline structure, without any change due to increase of thickness. Average diameter calculated from AFM images shows an increase in its value with increasing thickness, ranging from 77.92-95.76 nm. The electrical properties of heterojunction were obtained by I-V (dark and illuminated) and C-V measurement. I-V characteristic of the BaO/p-Si heterojunction shows good rectifying behavior under dark condition. The ideality factor and the saturation current density was calculated. The built- in potential (V_{bi}), carrier concentration and depletion width layer are determined under different thickness from C-V measurement.

Keywords: n-BaO/p-Si; chemical spray pyrolysis; heterojunction photodetector.

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