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Applicability check of ZnO crystals for device applications MITHUN BHOWMICK, Nazarbayev University, BRUNO ULLRICH, DAVID ARIZA, Universidad Nacional Autonoma de Mexico, HAOWEN XI, Bowling Green State University — There has always been vital interest in wide-band gap semiconductors for their applicability in short-wavelength photonic devices and in electronic devices operating in high frequency regime. Historically, ZnO was never favored as a potential material for the above applications primarily because of difficulty in growing it. This situation, however, has improved drastically in the past decade thereby renewing the attention on this material system. Hence, ZnO is being proposed for potential light emitting devices in the blue and UV regions of electromagnetic spectrum. ZnO single crystals are also being considered for high power transistors. In this work, we present investigations of optical properties of pure (99.99%) ZnO performing transmittance, reflectance, Raman, and photoluminescence measurements. The ZnO single crystals employed in this work, were obtained commercially. We present detailed analysis of the measured data through theoretical calculations. Our results identify the state-of-the-art application potential of commercially available ZnO, revealing its advantages and limitations when compared to similar materials such as GaN.

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