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Generalized model of the metal/n-GaN Schottky interface and improved performance by electrochemical Pt deposition

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Abstract

A modified model of the Schottky interface is proposed, which includes a near-surface layer (NSL) in the depletion region of the semiconductor. An important effect of the NSL is the ability to make the value of the Schottky barrier strongly voltage dependent, in agreement with experimental behavior. The proposed model can therefore qualitatively explain the observed peculiarities of Schottky contacts to the GaN and related materials. Pt/n-GaN Schottky contacts were fabricated by both electrochemical deposition and e-beam evaporation techniques. The use of electrochemistry resulted in significantly better performance of Schottky contacts. A comparative study of evaporated and electroplated contacts justifies the NSL model.