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Overview of band-edge and defect related luminescence in aluminum nitride

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Abstract

This review gives the reader an overview of the published results describing near band-edge as well as defect related luminescence in aluminum nitride, also presenting findings from theoretical reports investigating band-structure, intrinsic defects or foreign impurities. Especially in the case of defect related luminescences, the different points of view in literature are outlined and compared to each other. To facilitate future reference for respective energy transfers, the various assignments to specific emission peaks are presented in neatly arranged tables. Additionally, involved theoretical simulations are summarized in a condensed manner to give a simple view to key features investigated in the particular reports, respectively.

Keywords:

1. Introduction

The discovery of aluminum nitride (AlN) dates back to a report of Briegleb and Geuther from 1862 [1]. They prepared aluminum filings in a porcelain boat and heated them up for two hours under nitrogen atmosphere. After cooling
5 they observed a distinct weight gaining, a whitish surface and inside a tarnished yellowish-brownish coloring. Additionally, they found indications for nitrogen inside the material. Independently from Briegleb and Geuther, Mallet [2, 3]

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