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Author: Xiaohu Wu

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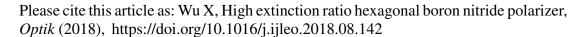
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High extinction ratio hexagonal boron nitride polarizer

Xiaohu Wu*

College of Engineering, Peking University, Beijing 100871, China

*Corresponding author, Email: 1401111520@pku.edu.cn

Abstract

In this paper, we theoretically studied that the high extinction ratio polarizers can be designed with

hexagonal boron nitride (hBN). We demonstrated that the transverse electric wave can pass the

single hBN slab with high transmissivity in the range of 6.25-7.4 µm, while the transverse

magnetic wave cannot pass through. The extinction ratio is always over 14 dB in that range.

Besides, we also proposed a photonic crystal polarizer made of hBN and silicon, which can work

in the visible band. The numerical results show that the polarizer allows the transverse magnetic

wave to pass and block the transverse electric wave in the range of 0.45-0.53 µm. The minimum

extinction ratio is 30 dB in this range. Therefore, we believe the low loss hBN is a promising

anisotropic material for realizing polarizers and it may have applications in photography and

liquid-crystal display (LCD) technology.

Keywords: hexagonal boron nitride, extinction ratio, optical polarizer, photonic crystal.

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