LUMINANCE AND COLOR OF GRATING SMART WINDOW FOR PEDOT-Al_2O_3 BY ALGEBRAIC EIGENVALUE

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ABSTRACT

A smart window is a window that can change its optical properties by the application of an electric field. We propose a new type of smart window, a grating smart window, by exploiting the periodic structure of Al_2O_3 and PEDOT, Poly(3,4-ethylenedioxythiophene) in an electrochromic layer. This thesis is a technical feasibility study of the grating smart window. We concentrate on the luminance and color indexes from the grating smart window. Those can be evaluated by converting from the light spectrum data. The commercial software GSolver is used to compute the transmitted spectrum (in the range of 380-750 nm) from the grating smart window. The spectra are converted through CIE XYZ colorimetry in order to find the color indexes which hold luminance information. Three grating types are investigated, one is single layer grating (A structure) and the others are double layer grating (B and C structure). The observed results are compared to that from a normal smart window. We found that when the PEDOT in the grating is in the transparent state (doped), the colors in the field of view from the gratings are rather homogeneous, like the normal one. In contrast, the dim state (neutral) shows various colors unlike the normal.

KEY WORDS: SMART WINDOW/ GRATING STRUCTURE/
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