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Abstract
In an edge-type Backlight Unit (BLU), a Cold Cathode Fluorescent Lamp (CCFL) is fixed within a lamp reflector which redirects the light emitted from the lamp toward the Light-Guide Plate (LGP). For enhancing the brightness of an edge-type BLU, the importance of lamp reflector design can not be overemphasized. However, it is difficult to accurately analyze the optical efficiency of a lamp reflector due to lack of accurate optical models of each optical element. So the development of an accurate optical model of CCFL is crucial for successful optical simulation of lamp reflector design. In this work, an optical model of CCFL based on measured data is developed in ASAP.
Several design issues have to be considered for optimal lamp reflector design, including the shape of lamp reflector, the gap between lamp body and lamp reflector, the optical properties of lamp reflector material, the diameter of a lamp, and the position of lamp and the size of lamp reflector, etc. Besides, for further improving the luminance of a BLU, micro-structures in the incidence plane of a LGP is investigated. By studying the interplaying of the important issues above, an optimal design for a specific BLU design case will evolve.
For further improving the optical efficiency of edge-type BLUs, a design concept, providing information related to angular distribution of light at the incidence plane of a LGP, is introduced. This will lead to a successful development of a “no optical film” BLU.
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