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Abstract
The LCD-TVs aren't self-emissive, light sources, BLUs, are required for illumination. Therefore the display quality is directly related to the performance of BLUs in LCD-TVs. The problem of luminance non-uniformity in a direct-type BLU is still a working issue for BLU engineers. In order to resolve this problem, the study of optical phenomena of diffusers definitely plays a key role, since its complexity in terms of optical mechanisms.
In this work, we study the parameters that influence the optical behaviors of diffusion plates, including particle sizes of scatters, particle concentration, relative refractive indices, diffusion plate thickness, and wavelength of incident light. There are two output parameters, total transmittance and haze, which are adopted to justify the performance of diffusions plates with different parameter combinations.
ASAP programming is performed to develop an optical model of diffusion plate and its measurement instrumentation. An optical model of diffusion plate is based on both mechanisms of Mie scattering and multiple scattering for the determination of scattering angle and path length, respectively, while light propagating in a diffusion plate undergoing a consecutive scattering events. Monte Carlo ray-tracing method is implemented in ASAP. In order to compare the simulation results of diffusion plates with the measured ones, ANSI/ASTM D1003 environment is also incorporated into our optical model.
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