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**United States Patent**

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*Michelle K. Lee*

*Director of the United States Patent and Trademark Office*



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(12) **United States Patent**  
**Chung et al.**

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(54) **QUASI-OPTICAL LED PACKAGE STRUCTURE FOR INCREASING COLOR RENDER INDEX AND BRIGHTNESS**

(58) **Field of Classification Search** ..... 313/498, 313/505, 506, 509, 512  
See application file for complete search history.

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(\* ) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 119 days.

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(57) **ABSTRACT**

A quasi-optical LED package structure for increasing color render index and brightness includes a substrate unit, a light-emitting unit, a frame unit and a package unit. The light-emitting unit has a first light-emitting module for generating a first color temperature and a second light-emitting module for generating a second color temperature. The frame unit has two annular resin frames surrounding formed on the top surface of the substrate unit by coating. The two annular resin frames respectively surround the first light-emitting module and the second light-emitting module in order to form two resin position limiting spaces above the substrate unit. The package unit has a first translucent package resin body and a second translucent package resin body both disposed on the substrate unit and respective covering the first light-emitting module and the second light-emitting module.

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(51) **Int. Cl.**  
**H01J 1/62** (2006.01)

**20 Claims, 15 Drawing Sheets**

(52) **U.S. Cl.** ..... 313/506; 313/509; 313/512

