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(54) **COMPOSITE QUANTUM-DOT OPTICAL FILM**

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(71) Applicant: **UBRIGHT OPTRONICS CORPORATION**, Taoyuan City (TW)

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(72) Inventors: **Chia-Yeh Miu**, Taoyuan City (TW);
Chia-Jung Chiang, Taoyuan City (TW); **TING YING LIU**, Taoyuan City (TW); **Lung-Pin Hsin**, Taoyuan City (TW); **Jeffrey Wu**, Taoyuan City (TW); **Hui-Yong Chen**, Taoyuan City (TW)

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(57) **ABSTRACT**

A composite quantum-dot optical film comprises a quantum-dot layer and a substrate, wherein the substrate comprises a unitary body formed by a first material, wherein a plurality of particles are disposed in the unitary body that encapsulates an outer surface of a first particle with said outer surface of the first particle being located above the top surface of the unitary body, wherein the substrate is disposed over the quantum-dot layer.

