Exhibit 5



(12) United States Patent Vo et al.

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(45) **Date of Patent:** Jun. 13, 2017

(54) QUANTUM DOT FILMS UTILIZING MULTI-PHASE RESINS

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(GB)

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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 312 days.

(21) Appl. No.: 14/460,008

(22) Filed: Aug. 14, 2014

(65) Prior Publication Data

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- (51) Int. Cl.

 B82Y 20/00 (2011.01)

 H01L 33/50 (2010.01)

 B32B 37/24 (2006.01)

 C09K 11/70 (2006.01)

 C09K 11/02 (2006.01)

(52) U.S. Cl.

(2013.01); *B32B 2307/7242* (2013.01); *B82Y* 20/00 (2013.01); *Y10T 156/10* (2015.01)

(58) **Field of Classification Search**CPC H01L 33/502; C09K 11/703; C09K 11/02
See application file for complete search history.

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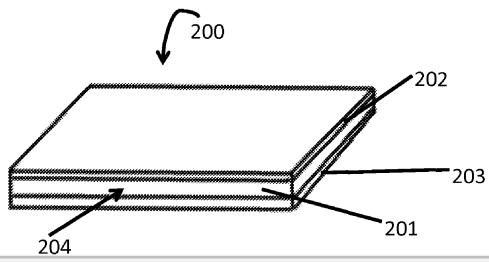
* cited by examiner

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(57) ABSTRACT

Multi-phase polymer films containing quantum dots (QDs) are described herein. The films have domains of primarily hydrophobic polymer and domains of primarily hydrophilic polymer. QDs, being generally more stable within a hydrophobic matrix, are dispersed primarily within the hydrophobic domains of the films. The hydrophilic domains tend to be effective at excluding oxygen.

1 Claim, 4 Drawing Sheets





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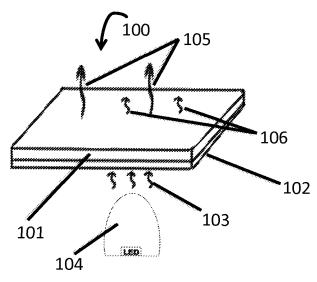
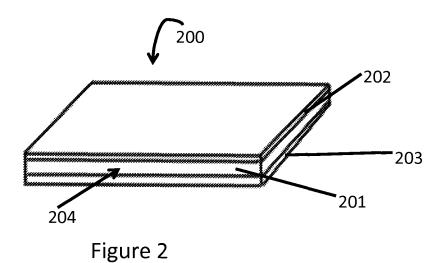


Figure 1 (prior art)



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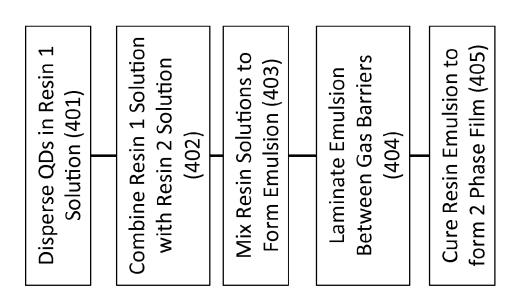
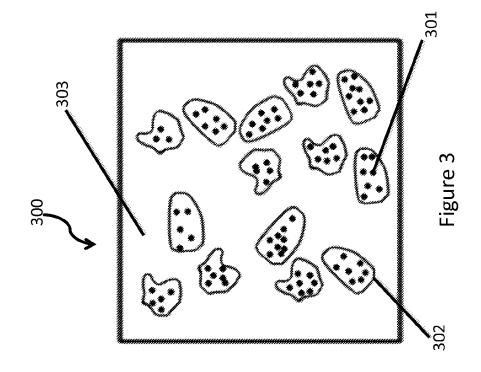


Figure 4



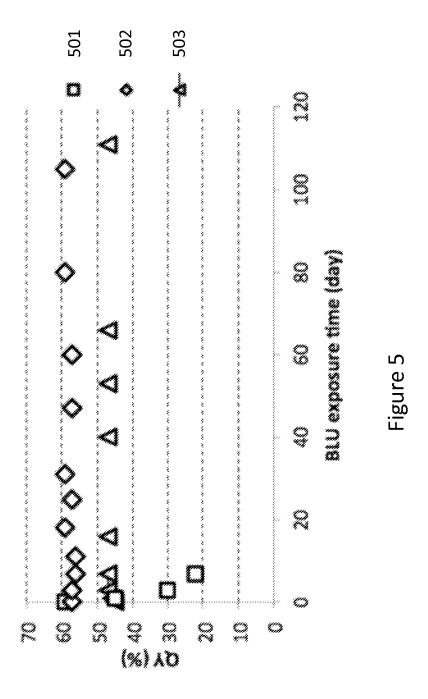


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