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Contribution of Increased Extraction Efficiency to Increased Photo-Luminescence in Strained Polymer Films PO-JUI CHEN, Dept. of Photonics Engineering, Yuan Ze University, ARNOLD CHANG-MOU YANG, Dept. of Materials Science and Engineering, National Tsing Hua University, JUI-HUNG HSU, Dept. of Material Science and Opto-electronic Science, National Sun Yat-sen University, JONATHON D. WHITE, Dept. of Photonics Engineering, Yuan Ze University — Potential applications of Luminescent Conjugated Polymers in thin film diodes, solar cells and flat panel displays have been limited by low efficiency. Craze formation in MEH-PPV/polystyrene thin film leads to a factor of 2 or 3 increase in collected photo-luminescence (PL) due to a combination of factors such as MEH-PPV chain conformation and increased extraction efficiency of PL. In order to determine the contribution of the latter effect, we used Monte Carlo based Ray Tracing to analyze the trajectory of photons generated in the thin film under different strain conditions. Our results indicate that increased PL extraction due to the existence of crazes contributes ∼15% of the observed increase in PL, the majority of this being due to light emitted near the craze edges.

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