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Polymer Films with Enhanced Light Emission ADAM THOMAS, ZACHARY BARCIKOWSKI, MARIAN TZOLOV, Lock Haven University — We present results on improving the photoluminescence quantum efficiency (PLQE) of Poly[2-methoxy-5-(2-ethylhexyloxy)-1,4-phenylenevinylene] (MEH-PPV) films by addition of polyfluorene derivatives poly(9,9-di(ethyl-hexyl)fluorine) (PFO) or poly(9,9-di(2-(2-(2-methoxy-ethoxy)ethoxy)ethyl)fluorenyl-2,7-diyl)(PFO-EO3). We have compared the optical absorption, photoluminescence emission and excitation spectra of the starting solutions with those of the films. We report the PLQE of the films upon excitation with different wavelengths. The PLQE of MEH-PPV films is enhanced from 12% to 17 % after addition of polyfluorenes when excited with light which is not absorbed by the polyfluorenes. We present results suggesting that the interpenetration of the polyfluorene chains in the MEH-PPV network leads to this improvement. Our comparison with the solutions allows us to conclude that the main mechanism for energy transfer from the PFO to MEH-PPV is the Förster transfer. We have applied the concept of interpenetrating structures in polymer light emitting devices. The polymer devices show a significant improvement in efficiency and light emission over the single film of MEH-PPV. The devices also hold their original color for the MEH-PPV enhanced polymer.

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