Abstract Submitted
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Rational design of charge transport molecules for blue organic light emitting devices ASANGA PADMAPERUMA, LELIA COSIMBESCU, PHILLIP KOECH, EVGUENI POLIKARPOV, JAMES SWENSEN, DANIEL GASPAR, PNNL, PACIFIC NORTHWEST NATIONAL LABORATORY TEAM — The efficiency and stability of blue OLEDs continue to be the primary roadblock to developing organic solid-state white lighting as well as power efficient displays. It is generally accepted that such high quantum efficiency can be achieved with the use of organometallic phosphor doped OLEDs. The transport layers can be designed to increase the carrier density as a way to reduce the drive voltage. We have developed a comprehensive library of charge transporting molecules using combination of theoretical modeling and experimental evidence. Our work focuses on using chemical structure design and computational methods to develop host, transport, emitter, and blocking materials for high efficiency blue OLEDs, along with device architectures to take advantage of these new materials. Through chemical modification of materials we are able to influence both the charge balance and emission efficiency of OLEDs, and understand the influence of the location of photon emission in OLEDs as a function of minor chemical modifications of host and electron transport materials. Design rules, structure-property relationships and results from state of the art OLEDs will be presented.

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