All Solution Processed, High Performance Polymer Light-Emitting Diodes

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Plastic electronics research holds the promise of ubiquitous thin, light weight and flexible display and lighting products via novel organic semiconductors. In particular, current lighting requirements account for a significant fraction of energy consumption, which could be considerably reduced by the use of highly efficient organic solid-state lighting systems. Whilst OLED based display and lighting devices are beginning to break into the market, a number of factors are holding them back from becoming the dominant technology. Among them, the requirement of high (for stability) workfunction metals as cathodes in OLEDs can result in large energetic barriers and high turn on voltages, so often intermediate layers such as low workfunction metals, ionic salts and more recently, conjugated polyelectrolytes are used to aid current injection. In this talk, I will introduce high performance polymer LED devices fabricated with all solution-processed, new charge injection/ transport organic and hybrid materials, addressing important design rules for these charge injection/ transport materials.