Through-space charge transfer in anthracene-based emitters – a new paradigm for TADF molecules

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Molecules featuring hot excited states represent an interesting class of emitters capable of thermally activated delayed fluorescence (TADF).[1] Representatives for these emitters rely on a so-called hot exciton or hot exciplex mechanism.[2] Both emission pathways have several characteristics in common: they rely on charge-transfer excited states, exhibit acceptable oscillator strengths, and are reported to exhibit extremely fast delayed fluorescence, almost indistinguishable from the prompt component.

In my work, I will compare donor-acceptor functionalized anthracenes that feature either hot exciton or hot exciplex emission, and I will explain why hot exciplexes show higher photoluminescence quantum yields than hot exciton molecules.[3] After optimization of the donor and acceptor strength (see Figure), I will present our most powerful emitter in an OLED with efficiency beyond the spin-statistical limit.

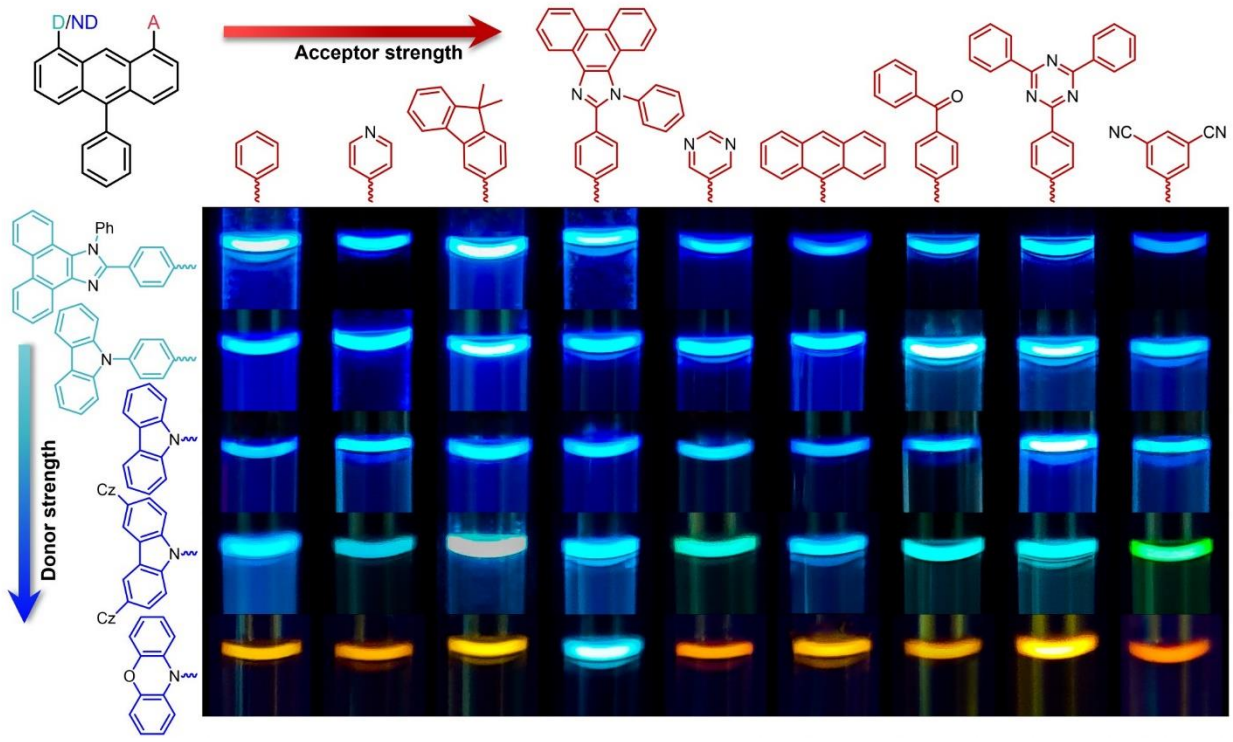

Figure 1: Optimization matrix of anthracene-based hot exciplex emitters.

References

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