Spacer exerted modulation of charge and energy transfer probability in all-BODIPY assemblies applied as photosensitizers and lasers

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The great growth of light-driven devices have boosted the search of photoactive organic molecules with improved and tunable photonic signatures. Multichromophoric molecular assemblies (MMAs) arise as an appealing alternative to overcome limitations associated with single dye molecules.[1] Boron-dipyrromethenes (BODIPYs) are ideal building blocks to design MMAs owing to their unique chemical versatility. The rational choice of spacer connecting the BODIPY subunits allows a deep and controlled modulation of the photo-physical properties of the MMA (Figure). Thus, a direct linkage of identical BODIPY units imposes an orthogonal arrangement of the dyad, which switch on intramolecular charge transfer (ICT). This key photoinduced state mediates in the triplet state population allowing the generation of singlet oxygen, a cytotoxic moiety involved in photodynamic therapy.[2] The ICT and the ensuing intersystem crossing (ISC) can be modulated by the insertion of *para*-phenyl spacers. Thus, triad combing both kind of linkages show dual activity as photosensitizer and fluorophores, whereas the phenyl-spaced triad display high fluorescence and lasing signal owing to the ICT suppression. This last triad is a suitable scaffold to design red-emitting light harvesters ongoing excitation energy transfer (ETT), thanks to the rich chemistry of BODIPYs.

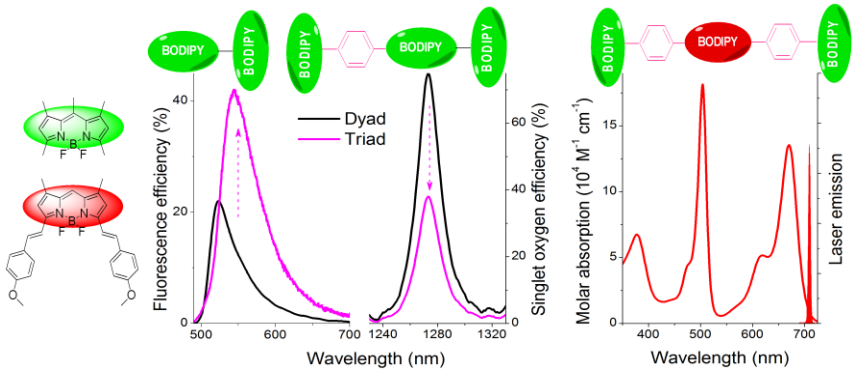

Figure. *Schematic view and absorption and emission spectra of the all-BODIPY dyads and triads.*

References

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