Synthesis and study of pseudo-rotaxanes and rotaxanes derived from Bodipy

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Résumé

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Summary:

In 2019, the World Health Organization (WHO) published a report indicating that, in 2050, the first cause of death in the world would be antimicrobial resistance.(1) This is due to the overuse of antibiotics in medicine and agriculture but also to their discharge into the environment. To face this problem, one of the possible solutions is the antimicrobial PhotoDynamic Therapy (aPDT) which uses the biocidal properties of singlet oxygen (**1O2**).(2) Among all the existing photosensitizers (PS), boron-dipyrromethene derivatives (Bodipy) are attractive dyes owing to their high modularity, photostability, and intense absorption under visible light irradiation.(3) Since the 1980s, mechanically interlocked molecules (MIMs) such as rotaxanes have been increasingly studied. However, there are only a few examples of biological applications of these structures.(4) As a part of a program devoted to the preparation of photosensitizers, we focused on the synthesis of (pseudo)-rotaxane based photosensitizers. Indeed, the rotaxane motif provides access to a PS with several key elements: a polyoxygen-Bodipy ring for the photosensitizer part and a positively charged axis for the interaction with the bacterial wall.(5) The synthesis of these mechanically interlocked molecules and their photophysical properties will be presented in this communication.

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