CN-Substitution Yields Photoefficient 2nd Generation Molecular Motors Responsive to Visible Light

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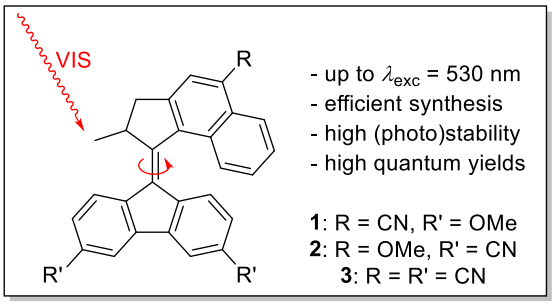

Over the last few years, interest in artificial molecular motors has greatly increased, as evidenced by a wealth of recent reviews and perspectives.[1–3] This extensive research has led to the discovery of various strategies to fine-tune the speed of rotation of these mechanical tools, with half-lives of the rate-limiting thermal helix inversion now ranging from millennia to the nanosecond regime.[1] However, so far only limited progress has been made towards substituting the classically used UV-light for visible and NIR-light to drive this rotation, which would greatly improve their applicability in soft materials and living organisms. Strategies explored to date suffer from added complexity due to the use of additional dyes and low quantum yields, drastically limiting their scope of application.[4–5]

In this contribution, we will present three novel CN-substituted 2nd generation molecular motors, all of which can be driven efficiently using visible light up to 530 nm, without the use of additional sensitizers. These compounds profit from an efficient synthesis, high (photo)stability as well as quantum yields. They also maintain the possibility for further functionalization, opening up a plethora of possible applications. Experimental results will be compared to those obtained by DFT calculations to gain further insight.

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