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Abstract

Rotating Micromachines with Stratified Disk Architecture for Dynamic Bioanalysis †

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Abstract: Magnetic microrobots with versatile mechanical motion will enable many ex- and in vivo applications. Unfortunately, monolithic integration of multiple functions in a streamlined microrobotic body is still challenging due to the compromise between fabrication throughput, device footprints, and material choices. In this talk, I will present a unified framework architecture for microrobotic functionalization to enable magnetically steered locomotion, chemical sensing and in vivo tracking. This has been achieved through stratifying stimuli-responsive nanoparticles in a hydrogelmicro-disk. We uncovered the key mechanism of leveraging spatially alternating magnetic energy potential to control a Euler's disk-like microrobot to locomote swiftly on its sidewall. The results suggest great potential for microrobots to locomote while cooperating a wide range of functions, tailorable for universal application scenarios.

Keywords: magnetic micromachine; stratified disk; dynamic bioanalysis; rotating magnetic field; microrobot functionalization

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