

Abstract

Rotating Micromachines with Stratified Disk Architecture for Dynamic Bioanalysis [†]

Gungun Lin ^{1,*}, Yuan Liu ¹, Guan Huang ¹, Yinghui Chen ¹, Denys Makarov ² and Dayong Jin ¹

¹ University of Technology Sydney, Sydney, NSW 2007, Australia; yuan.liu@uts.edu.au (Y.L.);

guan.huang@student.uts.edu.au (G.H.); yinghui.chen@uts.edu.au (Y.C.); dayong.jin@uts.edu.au (D.J.)

² Helmholtz-Zentrum Dresden-Rossendorf e.V., 01328 Dresden, Germany; d.makarov@hzdr.de

* Correspondence: Gungun.Lin@uts.edu.au

[†] Presented at the 1st International Conference on Micromachines and Applications, 15–30 April 2021;

Available online: <https://micromachines2021.sciforum.net/>.

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 micro-robotic functionalization to enable magnetically steered locomotion, chemical sensing and in vivo tracking. This has been achieved through stratifying stimuli-responsive nanoparticles in a hydrogel-micro-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

Citation: Lin, G.; Liu, Y.; Huang, G.; Chen, Y.; Makarov, D.; Jin, D. Rotating Micromachines with Stratified Disk Architecture for Dynamic Bioanalysis. *Eng. Proc.* **2021**, *4*, 46. <https://doi.org/10.3390/Micromachines2021-09572>

Supplementary Materials: The supplementary file is available online at <https://www.mdpi.com/article/10.3390/Micromachines2021-09572>.

Published: 15 April 2021

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