

2D-based nano/microrobots: Towards Biomedical and Environmental Applications

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Nano/microrobots with autonomous motion are the frontier of nanotechnology and nanomaterial research. These self-propelled nano/microrobots convert chemical energy obtained from their surroundings to propulsion. Particularly, the recent progress in targeted drug delivery^[1] and efficient water purification systems^[2] is very promising.

Graphene and the recently discovered layered materials -beyond graphene- have superior properties and have made a great impact on the new generation of energy, biomedical and environmental applications. Integration of single/few layers materials with extremely high surface area into nano/microrobots has been created a dynamic platform which could significantly enhance motor's functions in terms of adsorption capacity and mobility. We have employed 2D-based microrobots to demonstrate (i) organics^[3, 4]/heavy metals^[3]/ions^[5] collection and DOX loading^[1], (ii) a targeted transport system, (iii) the on-demand release mechanism, and (iv) the recovery of the robots for further usage.

References

- [1] B. Khezri, S. M. B. Mousavi, L. Krejcova, Z. Heger, Z. Sofer, M. Pumera, *Adv. Funct. Mater.*, 29 (2019) 10.
[2] L. Dekanovsky, B. Khezri, Z. Rottnerova, F. Novotny, J. Plutnar, M. Pumera, *Nature Machine Intelligence* 2 (2020) 711.
[3] S. M. Beladi-Mousavi, B. Khezri, L. Krejcova, Z. Heger, Z. Sofer, A. C. Fisher, M.

Pumera, *ACS Appl. Mater. Interfaces* 11, (2019)13359.

[4] B. Khezri, K. Villa, F. Novotny, Z. Sofer, M. Pumera, *Small* 2020, 16, 8; B. Khezri, S. M. B. Mousavi, Z. Sofer, M. Pumera, *Nanoscale* 11 (2019) 8825.

[5] S. M. Beladi-Mousavi, B. Khezri, S. Matejkova, Z. Sofer, M. Pumera, *Angew. Chem.-Int. Edit.*, 58 (2019)13340.

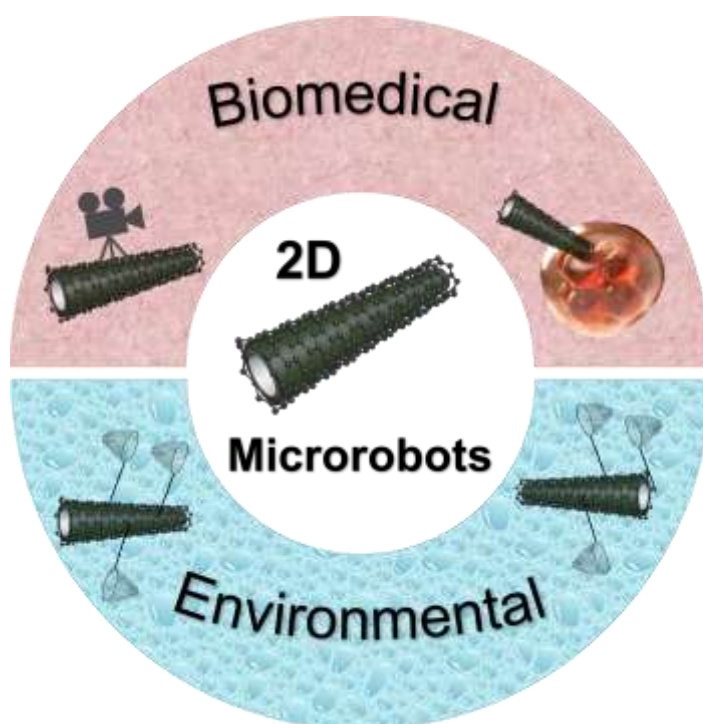


Figure 1: 2D-based nano/microrobots- Towards biomedical and environmental applications