

Nanoelectronic compact devices as innovative tools for biomedical research and diagnostics

Friday, 1 July 2022 15:50 (25 minutes)

Rapid demographic changes demand improved biomedical diagnostic technologies with rapidness, minimized invasiveness, low cost and high-throughput, without sacrificing the sensitivity. Considering the miniature size, scalability of fabrication, and ease of chemical modification, nanoscale transducers packaged in small and flexible electronic chips and integrated with additional circuits and lab-on-a-chip structures are ideal candidates to fulfill the task.

In our group, we have demonstrated the validity of multitude of nanoscopic transducers for the ultrasensitive and label-free detection of markers, in liquid(1,2) as well as in gas(3) samples, or for the microorganism monitoring in drug screening applications.(4)

In this talk, I will provide an overview of our contribution to the (bio)sensors field, including as well the use of alternative detection techniques based on memory properties(5,6), the integration with droplet microfluidics offering individual tracking of nanoliter reactors containing chemical reactions,(7) and the transfer of the transducers to flexible supports toward lower cost and light weight sensors(1,2) or for electronic skin applications.(8)

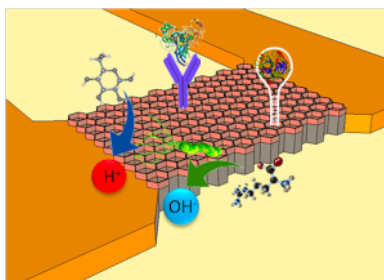


Figure 1:

REFERENCES

- 1 P. Zhang, S. Yang, R. Pineda-Gómez, B. Ibarlucea, J. Ma, M. R. Lohe, T. F. Akbar, L. Baraban, G. Cuniberti and X. Feng, *Small*, 2019, 15, 1901265.
- 2 D. Karnaushenko, B. Ibarlucea, S. Lee, G. Lin, L. Baraban, S. Pregl, M. Melzer, D. Makarov, W. M. Weber, T. Mikolajick, O. G. Schmidt and G. Cuniberti, *Adv. Healthc. Mater.*, 2015, 4, 1517–1525.
- 3 L. A. Panes-Ruiz, L. Riemenschneider, M. M. Al Chawa, M. Löffler, B. Rellinghaus, R. Tetzlaff, V. Bezugly, B. Ibarlucea and G. Cuniberti, *Nano Res.*, 2022, 15, 2512–2521.
- 4 B. Ibarlucea, T. Rim, C. K. Baek, J. A. G. M. G. M. De Visser, L. Baraban and G. Cuniberti, *Lab Chip*, 2017, 17, 4283–4293.
- 5 B. Ibarlucea, T. F. Akbar, K. Kim, T. Rim, C.-K. C.-K. C.-K. K. Baek, A. Ascoli, R. Tetzlaff, L. Baraban, G. Cuniberti, T. Fawzul Akbar, K. Kim, T. Rim, C.-K. C.-K. C.-K. K. Baek, A. Ascoli, R. Tetzlaff, L. Baraban and G. Cuniberti, *Nano Res.*, 2018, 11, 1057–1068.
- 6 B. Ibarlucea, L. Römhildt, F. Zörgiebel, S. Pregl, M. Vahdatzadeh, W. M. Weber, T. Mikolajick, J. Opitz, L. Baraban, G. Cuniberti, B. Ibarlucea, L. Römhildt, F. Zörgiebel, S. Pregl, M. Vahdatzadeh, W. M. Weber, T. Mikolajick, J. Opitz, L. Baraban and G. Cuniberti, *Appl. Sci.*, 2018, 8, 950.
- 7 J. Schütt, B. Ibarlucea, R. Illing, F. Zörgiebel, S. Pregl, D. Nozaki, W. M. Weber, T. Mikolajick, L. Baraban and G. Cuniberti, *Nano Lett.*, DOI:10.1021/acs.nanolett.6b01707.
- 8 B. Ibarlucea, A. Pérez Roig, D. Belyaev, L. Baraban and G. Cuniberti, *Microchim. Acta*, 2020, 187, 520.

Presenter: Dr IBARLUCEA, Bergoi (Institute of Materials Science, TU Dresden, Germany)

Session Classification: Session