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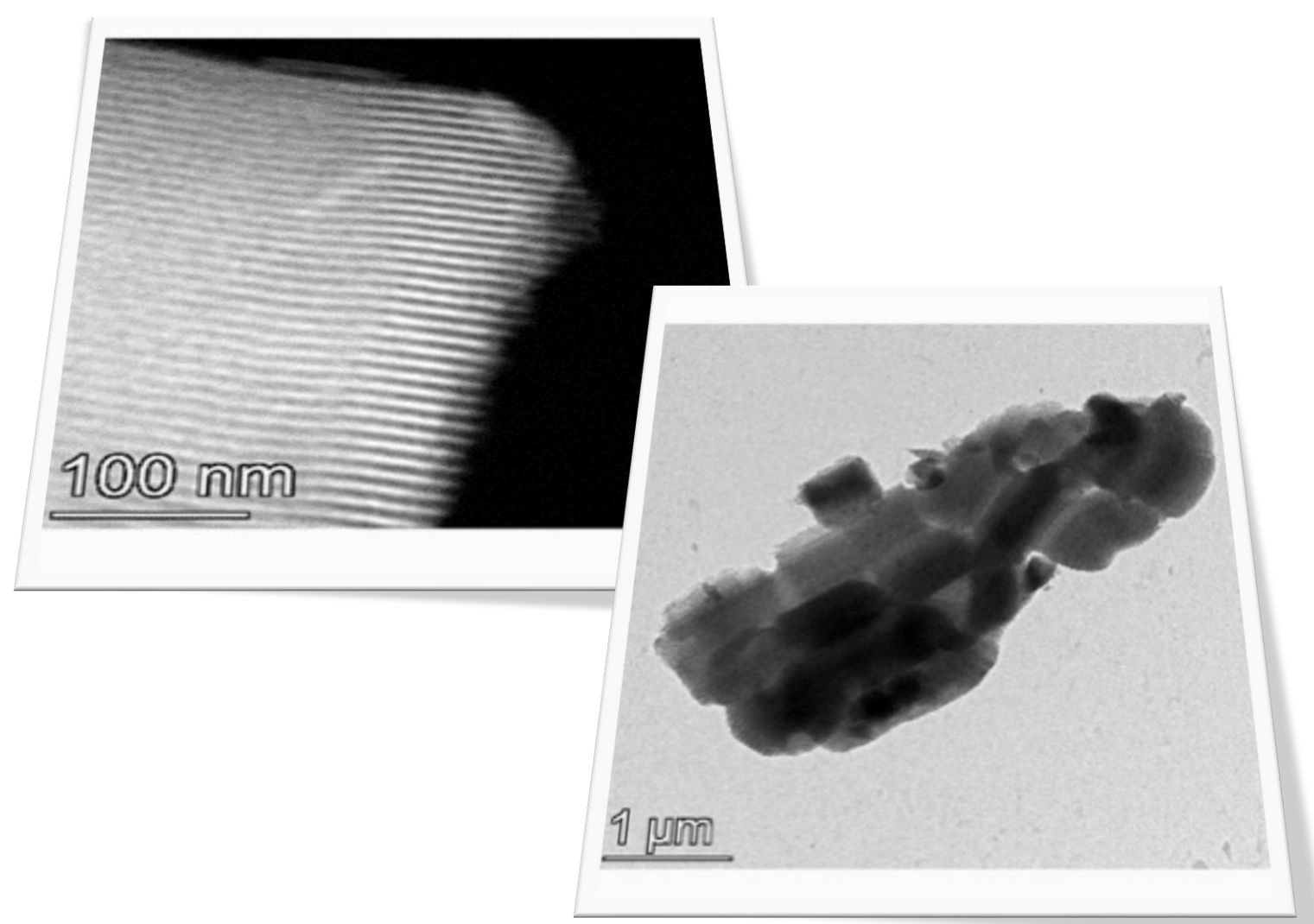
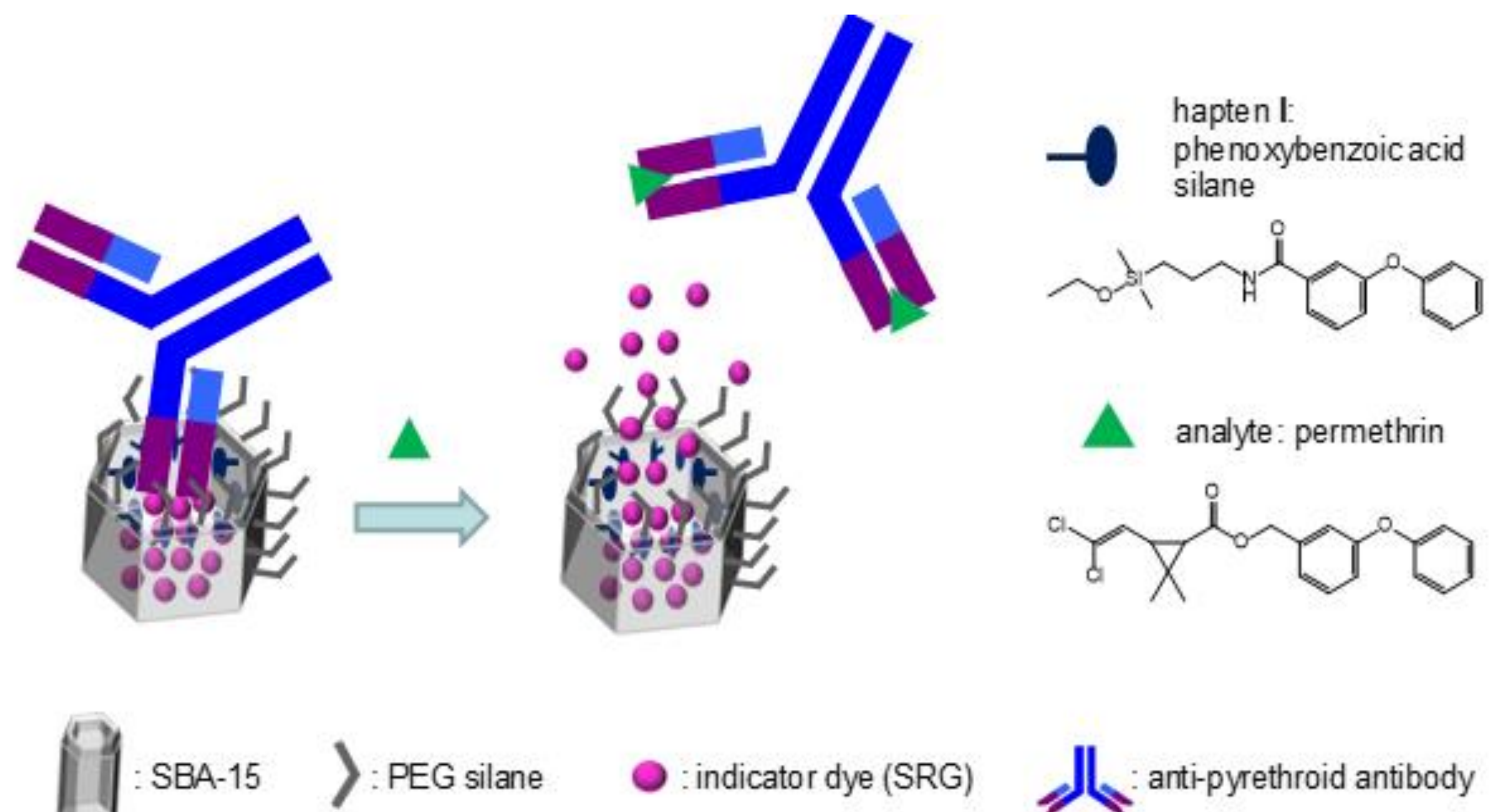
## Development of a lateral flow test for rapid pyrethroid detection

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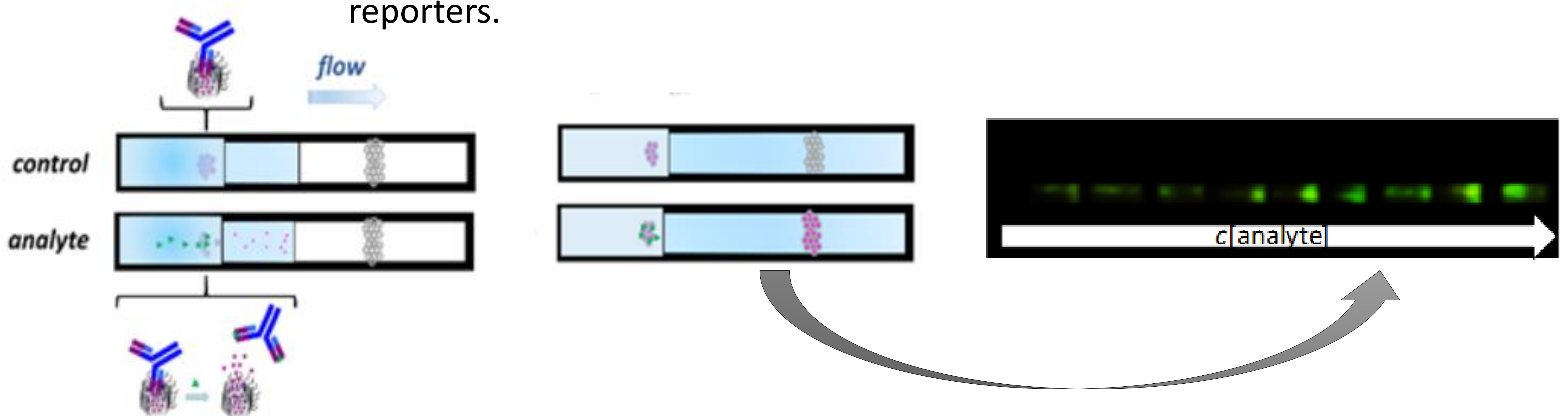
### Motivation

Type-I pyrethroids are frequently used for disinfection purposes on airplanes from and to tropical areas as a preventive health measure to control or kill the insect vectors of human diseases including dengue, yellow fever and malaria. [1, 2] The aim of the presented work was the development of a simple, rapid and effective method for pyrethroid analysis directly at the point of interest.

### Antibodies (Ab) closing the pores, like a cork in a bottle



The indication is achieved through antibody-gated indicator release from the pores of mesoporous silica particles, incorporated on a test strip. The Ab caps bound to the “gatekeeper” entities at the pore openings through a Ab-hapten complex are only detached upon advent of the designated analyte, opening the pores and releasing a large number of indicator molecules. The result is the amplification of the binding of one analyte into the release of hundreds of reporters.



### Conclusions

It was possible to detect Permethrin (type-I pyrethroid) at concentrations down to 1 ppb in less than 5 min, using a 3D-printed case as the strip holder and a smartphone for signal readout. [3] The reported method is modular and can thus be adapted for many different analytes and field analytical scenarios for instance in point-of-care and point-of-need diagnostics.



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### REFERENCES:

- [1] Aircraft Disinsection Insecticides. Report Environmental Health Criteria 243, World Health Organization, Geneva, 2013.
- [2] Report of the WHO Ad-hoc Advisory Group on aircraft disinsection for controlling the international spread of vectorborne diseases. Report WHO/HSE/GCR/2016.12, World Health Organization, Geneva, 2016
- [3] E. Costa, E. Climent, S. Ast, M. G. Weller, J. Canning, K. Rurack, Analyst, 2020, DOI: 10.1039/D0AN00319K



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