# Detection of environmental harmful substances by surface enhanced Raman spectroscopy (SERS)

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The detection of low molecular weight substances is important in life sciences, for instance in the analysis of pollutions in the environment. Pharmaceutical substances like antibiotics waste the groundwater and can cause multiresistant bacteria. A fast, easy and very sensitive detection method is Raman spectroscopy [1]. Due to the low sensitivity of Raman spectroscopy, a plasmonic active surface is used to enhance the Raman signal.
Within this contribution silver nanosquares [2] (see figure 1) are implemented in a microfluidic setup (see figure 2) to detect sulfamethoxazole (SMOZ), which is an antibiotic substance applied in urinary tract infections. The plasmon resonance of the used plasmonic material can be easily tuned to certain wavelengths. The microfluidic chamber creates more stable measurement conditions and prevents carbon background signals which are often observed in SERS spectra recorded under dry conditions. The successful detection of SMOZ down to concentrations in the nanomolar range will be presented.

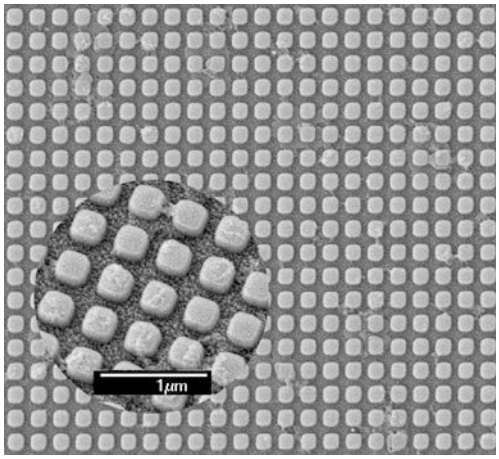


***Fig. 1:*** *Silver nanosquares are employed as plasmonic material.*

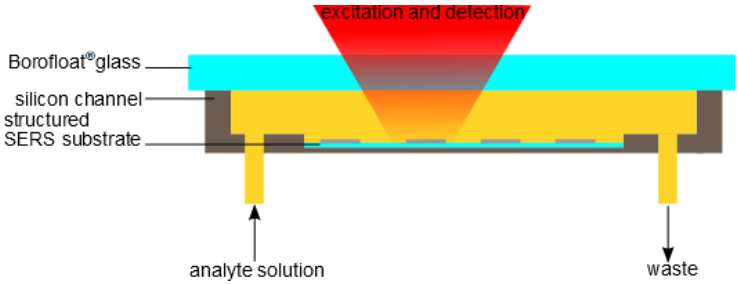


***Fig. 2:*** *Scheme of the applied microfluidic setup with the embedded SERS array*

Acknowledgement: Funding of the research projects 'QuantiSERS' and 'Jenaer Biochip Initiative 2.0' within the framework 'Unternehmen Region – InnoProfile Transfer' and further 'Photonic Nanomaterials (PhoNa)' within the framework 'Spitzenforschung und Innovation in den Neuen Ländern' from the Federal Ministry of Education and Research, Germany (BMBF) is gratefully acknowledged. The authors thank Falk Liebold (Analytik Jena AG) for supplying the microfluidic setup.

*[1] D. Cialla et al., AnalBioanalChem, **2012**, 403, 27-54*
*[2] U. Huebner et al., Microelectronic Engineering, **2011**, 88, 1761-1763*