



1 *Measuring kit with integrated display and sensing electrode*

2 *Raspberry Pi Hat for the Citizen Sensor measurement kit*

Fraunhofer Research Institution for Microsystems and Solid State Technologies EMFT

Hansastraße 27 d
80686 München
Phone: +49 89 54 75 90
Fax: +49 89 54 75 95 50
e-mail: contact@emft.fraunhofer.de

Contact person:
Katrin Tina Möbius
Katrin.Moebius@emft.fraunhofer.de

www.emft.fraunhofer.de

Fraunhofer EMFT is participant of the

NITRATE CHECK WITH MOBILE MEASURING KIT

Applications

Within the framework of the „CitizenSensor“ project, a team of Fraunhofer EMFT and FabLab Munich developed an electrochemical measuring kit for analyzing the nitrate content of the soil directly on site.

The step-by-step instructions displayed on the integrated monitor make the handling easy even for amateurs.

Technical Innovation

The measuring kit is based on a plug-in module (Hat) for the Raspberry Pi, which receives signals from chemical sensors. The heart of the Hat is a meter-on-a-chip microcontroller with 16-bit A/D converter and frequency generator up to 75 kHz. For the measurement, an ion-selective electrode with exchangeable ionophore membrane for nitrate is used in combination with an AgCl reference electrode. At present, the detection limit lies at about 4 mg/l.

The Python software, designed in-house, takes care of everything from sampling to documentation of the measurement results, explains the individual steps, carries out electrical measurements and compensates for interfering variables.

Outlook

Since almost all commercial ion-sensitive electrodes are compatible with the Hat, it is possible to adapt the system to the detection of other ions with little effort. The focus on components and materials that are generally accessible as well as the „hands-on“ functionality enable straightforward and uncomplicated implementation of innovative ideas in the field of environmental analytics. Most of the project results will be published under open source licenses.

The project is funded by the Federal Ministry of Education and Research BMBF under the Reference number BF1711A-C.