

Chair of Bioprocess Engineering

The Sens-o-Spheres System - Smallest autonomous sensors with features

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Sens-o-Spheres

The Vision of 2014

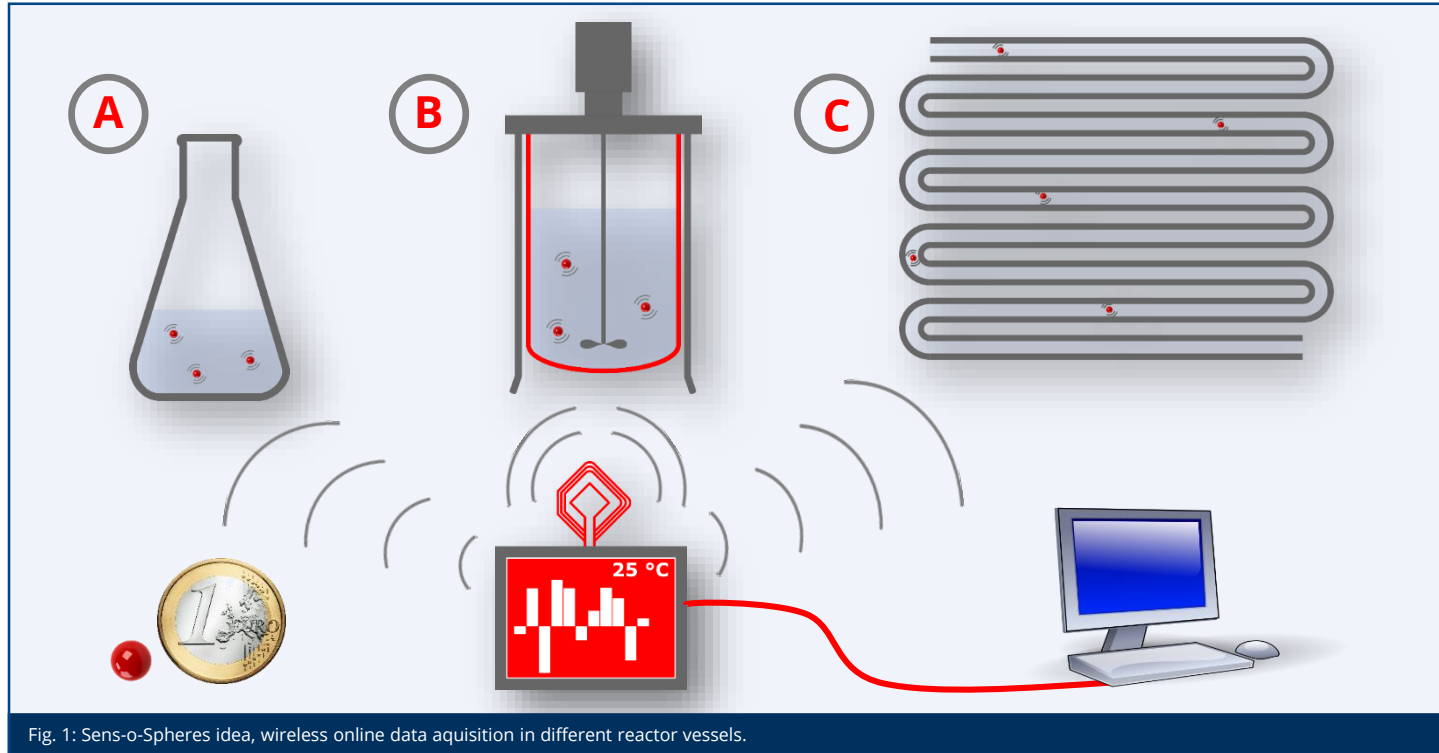
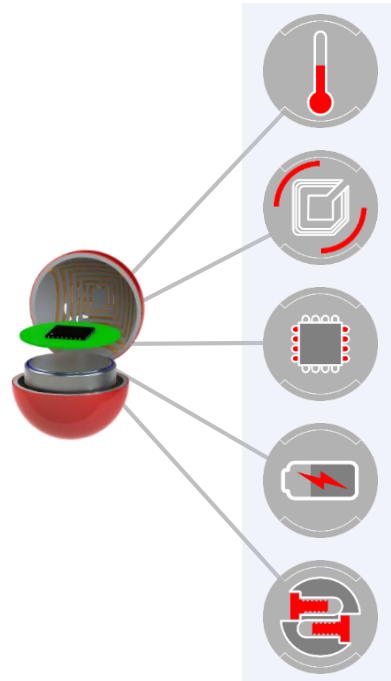


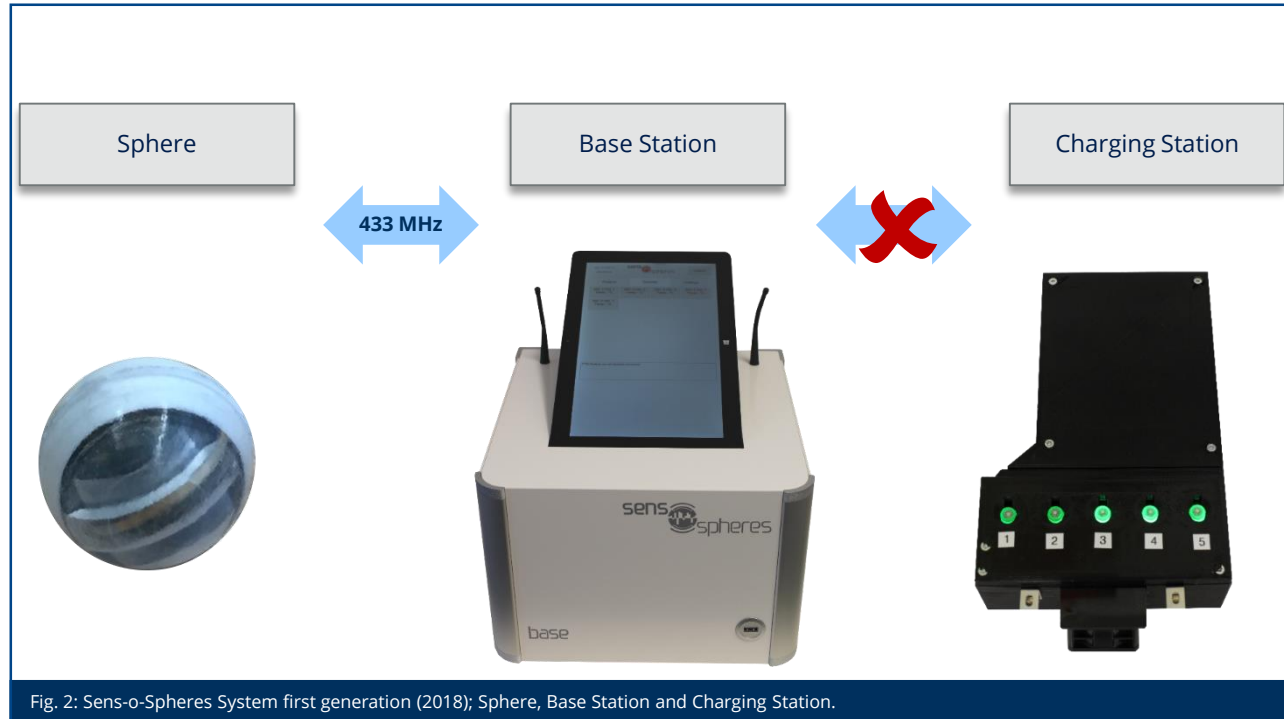
Fig. 1: Sens-o-Spheres idea, wireless online data acquisition in different reactor vessels.

Sens-o-Sphere Set-Up



- Transmitter
- Antenna
- Micro chip
- Power Supply
- Biocompatible Shell

Sens-o-Spheres - System Architecture 2018



Sens-o-Spheres – First generation

Applikation 2019

Fig. 3: Sens-o-Spheres System in incubator

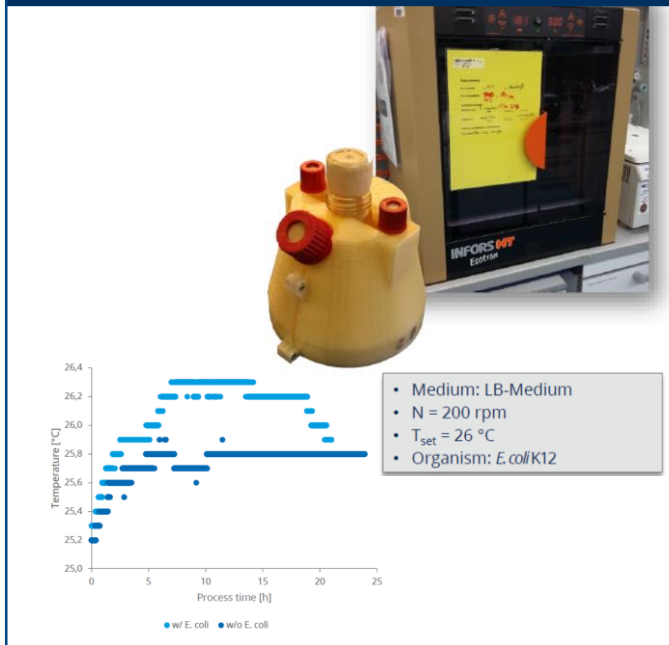
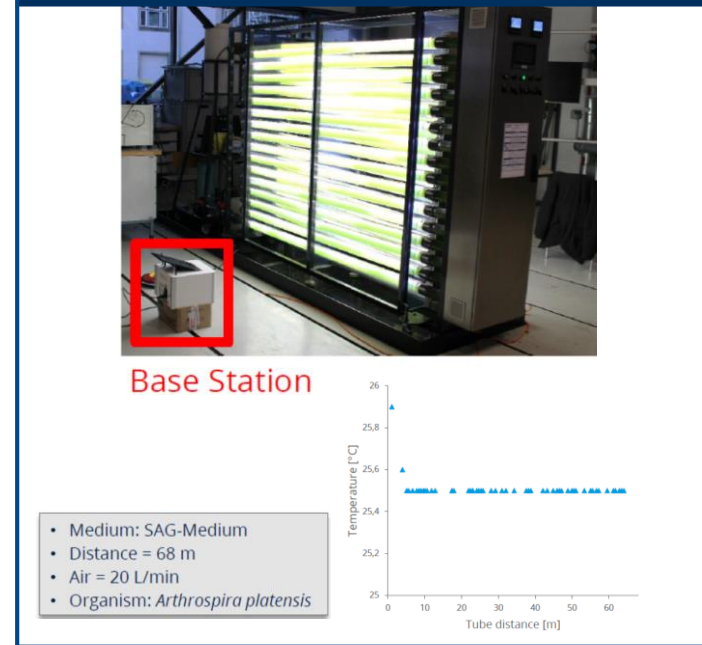


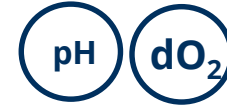
Fig. 4: Sens-o-Spheres System in tube reactor.



Lauterbach, T.; Lüke, T.; Büker, M.-J.; Hedayat, C.; Gernandt, T.; Moll, R.; Grösel, M.; Lenk, S.; Seidel, F.; Brunner, D.; Bley, T.; Walther, T.; Lenk, F. Measurements on the Fly– Introducing Mobile Micro-Sensors for Biotechnological Applications. *Sens. Actuators Phys.* **2019**, *287*, 29–38. <https://doi.org/10.1016/j.sna.2019.01.003>.

Sens-o-Spheres – possible projects for students

Topic 1: optimization of the solid state reference electrode used in miniaturized oxygen and pH sensor modules



Topic 2: packaging of miniaturized sensor elements for a modular design

Topic 3: Design of a glucose sensor based on chronoamperometric sensor element

