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［MEMS and VLSI Integration］

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http://toshi.iis.u-tokyo.ac.jp/toshilab/
専門分野 微小電気機械システム
関連専攻：先端学際工学専攻

Large Scale Arrayed Digital Electronic Noses and Tongues for Biotechnological Production Process Monitoring

バイオ燃料生成モニタ用大規模集積デジタル嗅覚・分子センサ

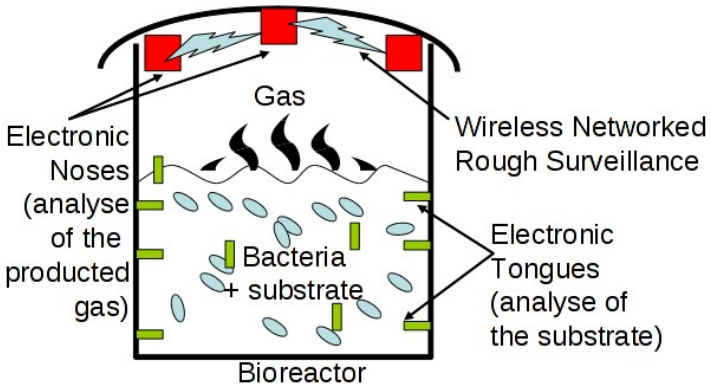
MEMS and NEMS sensors are integrated with VLSI devices for driving, controlling, and signal processing to compose the e-nose and e-tongue. The e-nose and the e-tongue consist on ultra-sensitive arrayed sensing elements which are one-by-one in situ connected to the A/D converter.

集積化MEMS／NEMS技術を応用した大規模集積分子センサを製作し、それをメタンガス等のバイオ燃料生成プラントのモニタとして応用する研究を行っている

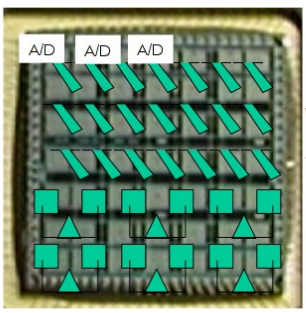
◆Precise on-line monitoring of biotechnologycal production process, like fermentation (food transformation, bio-fuel or hydrogen production...).
◆Tiny, wireless sensors to be placed easily anywhere desired in the reactor.
◆Disposable system easily replacable when contaminated.

◆**Electronic-nose:**
- placed in the headspace of the bioreactor,
- analyse the composition of the produced gas,
- array of functionalized cantilevers which resonant frequency change would inform on the produced gas composition.

◆**Electronic-tongue:**
- placed inside the fermentation substrate,
- analyse locally the composition of the substrate,
- array of electrodes which impedence change would inform on the local composition of the substrate.



Principle of the System



Integrated e-nose and e-tongue onto a VLSI system.