NERNST: Microfluidic Analysis for Mars

Sample handling:
- Reagent additions without sample contamination
- Acid additions/titrations can be repeated on a single sample for increased precision
- Locations on a chip can be designated for detection of a target analyte – e.g. ClO$_4^-$

Analysis:
- Increased redundancy of sensors
- Arrays of electrodes with various selectivities
- Calibration performed over entire dynamic range
- ISEs can have selectivity determined in situ

Flight (microfluidics):
- Small footprint
- Low mass/power
- Small reagent volume
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Main chip functions:
- Fluid manipulation
- Reagent addition
- Sample dilution
- Mixing
- Delivery to sensors

Measurable anions:
- \( \text{SO}_4^{2-} (\text{Pb}) \)
- \( \text{NO}_3^- (\text{Ag}) \)
- \( \text{O}_2^- (\text{Au}) \)
- \( \text{O}_2^{2-} (\text{Pt}) \)
- \( \text{ClO}_2^- (\text{Ag/Pt}) \)
- \( \text{ClO}_4^- (\text{Ag/Pt}) \)

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