

## SUPPORTING INFORMATION

### **Real-time Mapping of Calcification Process by *Sporosarcina Pasteurii* Biofilm**

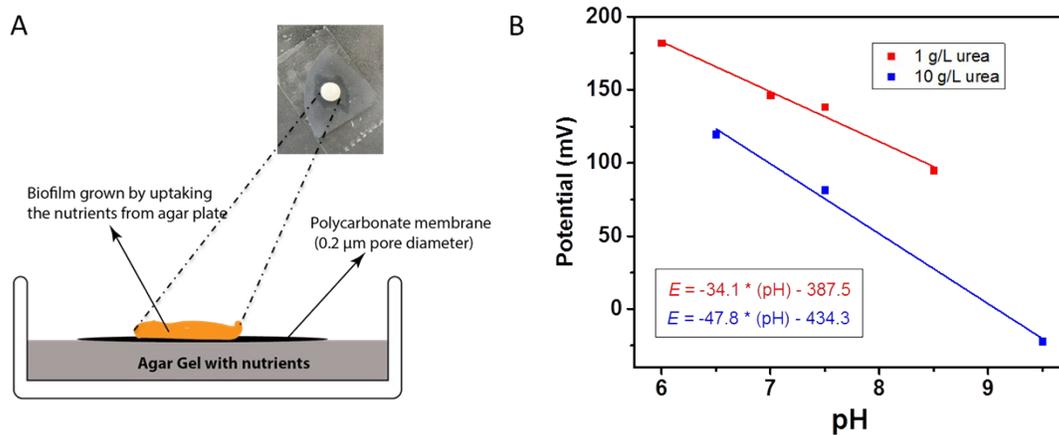
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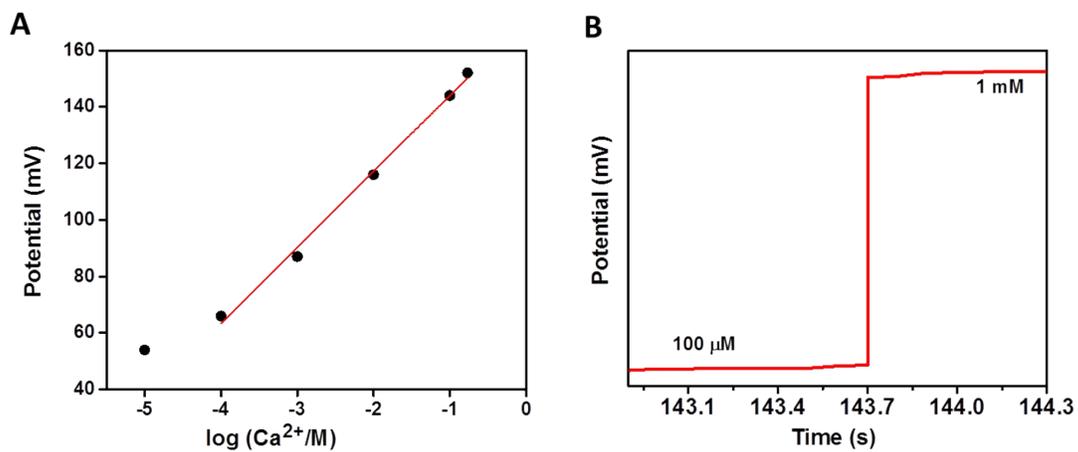
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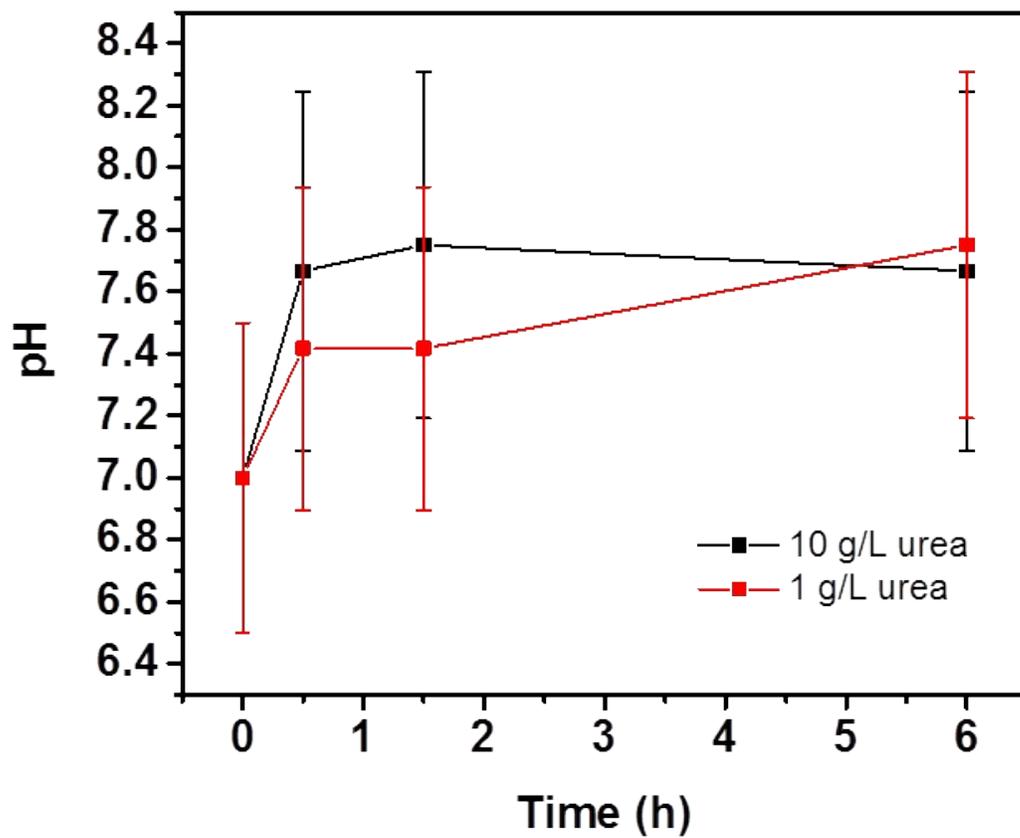
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**Figure S1:** (A) Schematic diagram of membrane-biofilm sample preparation on nutrient containing agar plate. (*inset*) An optical image of a membrane-biofilm sample attached to a double-sided tape on a petri dish. (B) Calibration curve of the pH microsensor to be used as a SECM tip to map the proton gradient produced by biofilm. The red line and squares indicate the calibration of pH sensor in 1 g/L urea in brine, and blue line and squares indicate the calibration of pH sensor in 10 g/L urea in brine.



**Figure S2:** A. Calibration curve of the calcium ion microsensor in brine at pH 4.5, to be used as an SECM tip to map calcium ion gradient produced by biofilm. The slope of the linear portion of the graph was  $26.9 \text{ mV}/\log [\text{Ca}^{2+}]$ . B. Response time for the sensor for a decade change in calcium ion concentration. The average response time was  $0.5 \text{ s}$ .



**Figure S3:** Bulk pH of brine solution during biofilm exposure in presence of 1 and 10 g/l urea. pH was measured using colorimetric test strips. The measured bulk pH was used to adjust the background for the pH z-scans.

|                       | Free calcium ion concentration (mM) |               |               |               |
|-----------------------|-------------------------------------|---------------|---------------|---------------|
| <b>Method/pH</b>      | <b>pH 4.5</b>                       | <b>pH 6.0</b> | <b>pH 7.2</b> | <b>pH 8.2</b> |
| Ca <sup>2+</sup> ISME | 170                                 | 120           | 85            | 37            |
| Colorimetric Assay    | 170                                 | 106           | 87            | 54            |

**Table S1:** Concentration of free calcium ions in brine at different pH solutions.