FORCE SENSOR PROBE USING QUARTZ CRYSTAL RESONATOR HAVING 10⁴ MEASUREMENT RANGE FOR MECHANICAL CHARACTERIZATION OF SPHEROIDS

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Dynamic range: 2.5 × 10⁴ (1.9 μN ~ 50 mN)

Biological characteristics $\leq \leq$ Mechanical characteristics \Rightarrow Q.E.







Fabrication Calibration 36.990 0.3 Resolution: 1.9 μN *y*=-154,671*x*+36,998,798 shift [ΔHz] (i) Patterning (e) Patterning (a) Patterning 0.2 36.988 N 36.986 $R^2 = 0.9995$ 0.1 (j) Sandblasting (b) Sandblasting (f) Sandblasting S 0.0 June 10.0 Ju Stability: 0.3 Hz 9 36.984 (k) Wet etching (c) Patterning (g) Wet etching 또 또 36.982 Measurement range: 10⁴ Sensitivity: 154,671 Hz/N 36.980 -0.3 (h) Pattering (d) Patterning 30 60 150 180 90 0.04 120 0.00 0.01 0.02 0.03 0.05 (I) Bonding Cr/Au **Resist** Applied force [N] Quartz Time [s] Experiment Stiffness Index $\triangle Reaction force$ Force sensor probe | t=0 s t=80 s t=40 s SI △*Deformation* × *Spheroid size* XYZ stage x10³



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Reference:

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