

## Supplementary Figures

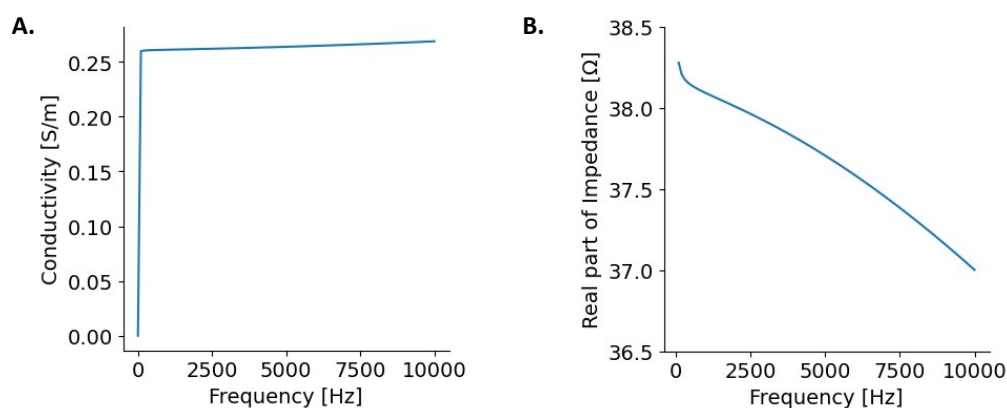


Figure 1: Conductivity and Impedance of the CH-BH-coated electrode at different frequencies

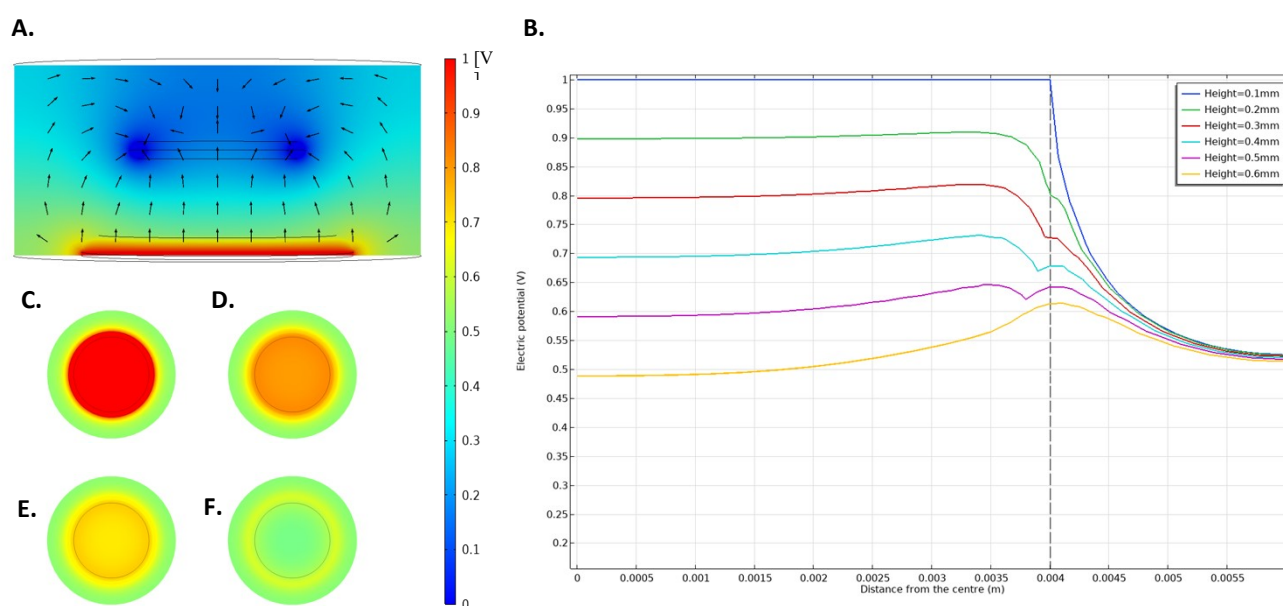


Figure 2: Numerical model of voltage distribution within the multi-layered hydrogel coating, for 1V stimulation at 1Hz. (A) 3D view of the simulation results with the direction of the electric field and magnitude. The chamber represents the electrode in a standard well of a culture plate, submerged in culture media. The bottom part represents the Pt electrode (1) and the CH-BH-coating (2), while the top part represents the counter electrode (3). (B) Electric potential across the cross-section of the hydrogel coating for different heights. A height of 0.1mm corresponds to the Pt surface, and a height of 0.6mm is the hydrogel-solution interface. Distribution of the electric potential across the coating at the height of (C) 0.1mm, (D) 0.3mm, (E) 0.4mm and (F) 0.6mm.