# Electronic supplementary information (ESI)

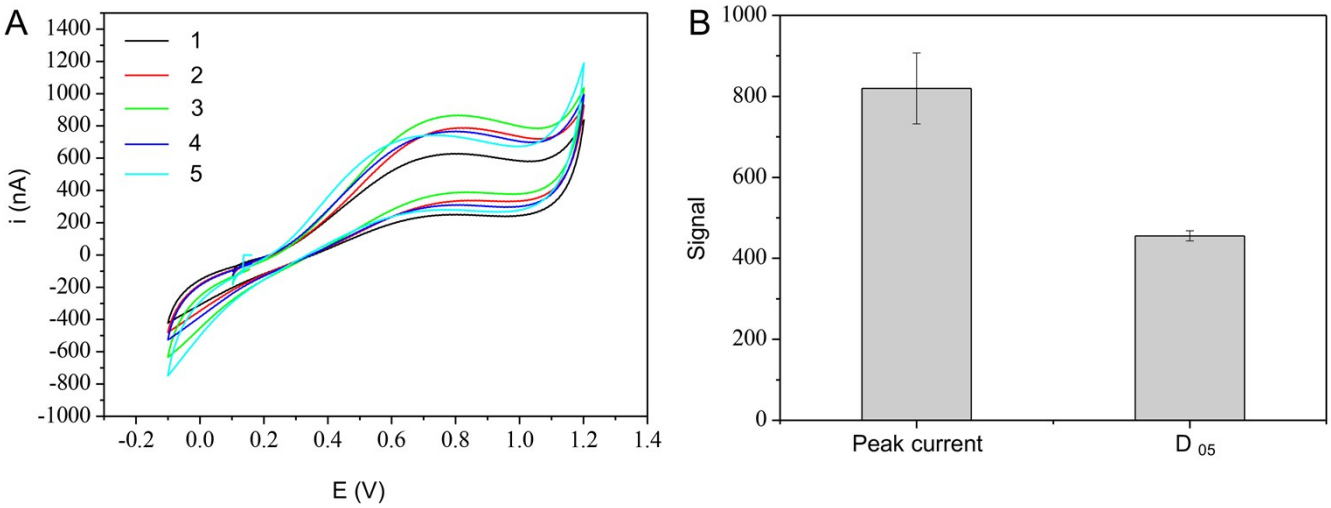


**Fig. S1** Five independence repeat of cyclic voltammetric scans of 11.1 mM glucose in artificial ISF pH 7.4, at 37 ℃ versus Ag/AgCl reference. (A) peak currents, (B) $D_{05}$.

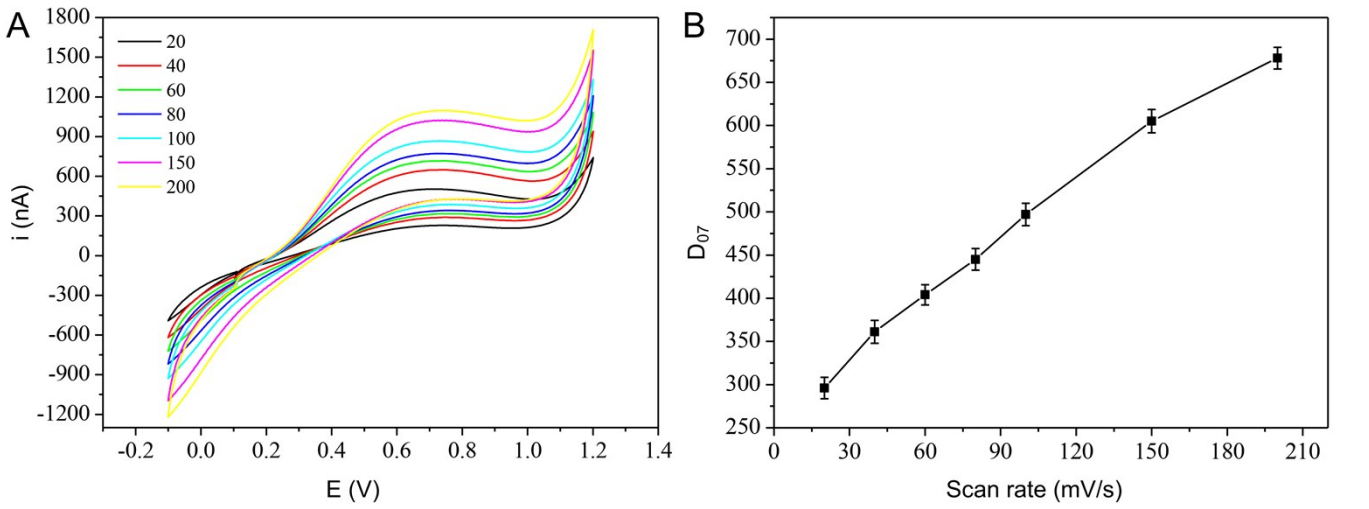


**Fig. S2** Cyclic voltammetric scans of 11.1 mM glucose in artificial ISF pH 7.4, at 37 ℃ versus Ag/AgCl reference at varying scan rates from 20 to 200 mV/s (A) and $D_{05}$ versus the scan rate (B).

Table S1. Formulation for optimization of microneedle biosensor (ratio of silk to D-Sorbitol)

| Silk/D-Sorbitol/GOD (wt/wt/U) | Silk (6%, wt/v) (mL) | D -Sorbitol (30%, wt/v) (mL) | GOD (7500 U/mL) (mL) | $H_2O$ (mL) |
|---|---|---|---|---|
| 10/0/200 | 8.3 | 0 | 0.267 | 1.433 |
| 10/0.5/200 | 8.3 | 0.083 | 0.267 | 1.350 |
| 10/1/200 | 8.3 | 0.16 | 0.267 | 1.173 |
| 10/2/200 | 8.3 | 0.33 | 0.267 | 1..103 |
| 10/3/200 | 8.3 | 0.5 | 0.267 | 0.933 |

**Table S2** Formulation for optimization of microneedle biosensor (amount of GOD loading)

| D-Sorbitol/silk/GOD (wt/wt/U) | Silk (6%, wt/v) (mL) | D-Sorbitol (30%, wt/v) (mL) | GOD (7500 U/mL) (mL) | $H_2O$ (mL) |
|---|---|---|---|---|
| 10/3/20 | 8.3 | 0.5 | 0.027 | 1.173 |
| 10/3/40 | 8.3 | 0.5 | 0.054 | 1.146 |
| 10/3/60 | 8.3 | 0.5 | 0.081 | 1.119 |
| 10/3/80 | 8.3 | 0.5 | 0.108 | 1.092 |
| 10/3/100 | 8.3 | 0.5 | 0.135 | 1.062 |
| 10/3/200 | 8.3 | 0.5 | 0.270 | 0.930 |
| 10/3/400 | 8.3 | 0.5 | 0.540 | 0.660 |
| 10/3/600 | 8.3 | 0.5 | 0.810 | 0.390 |
| 10/3/800 | 8.3 | 0.5 | 1.080 | 0.120 |
| 10/3/1000 | 8.3 | 0.5 | 1.35 | 0 |