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Supplementary information

Resonant tunneling on a colloidal CdS semiconductor quantum-dot single-electron transistor based on heteroepitaxial-spherical Au/Pt nanogap electrodes

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Theoretical I_{SET}-V_d curves based on the orthodox theory of SET

Figures S1(a)-S1(e) show theoretical I_{SET}-V_d curves based on the orthodox theory of SET. Each SET parameter was varied ±5 % from the optimized values: R_s = 280 MΩ, R_d = 50 MΩ, C_s = 200 zF, C_d = 300 zF, and Q_0 = 0.015 e, respectively.

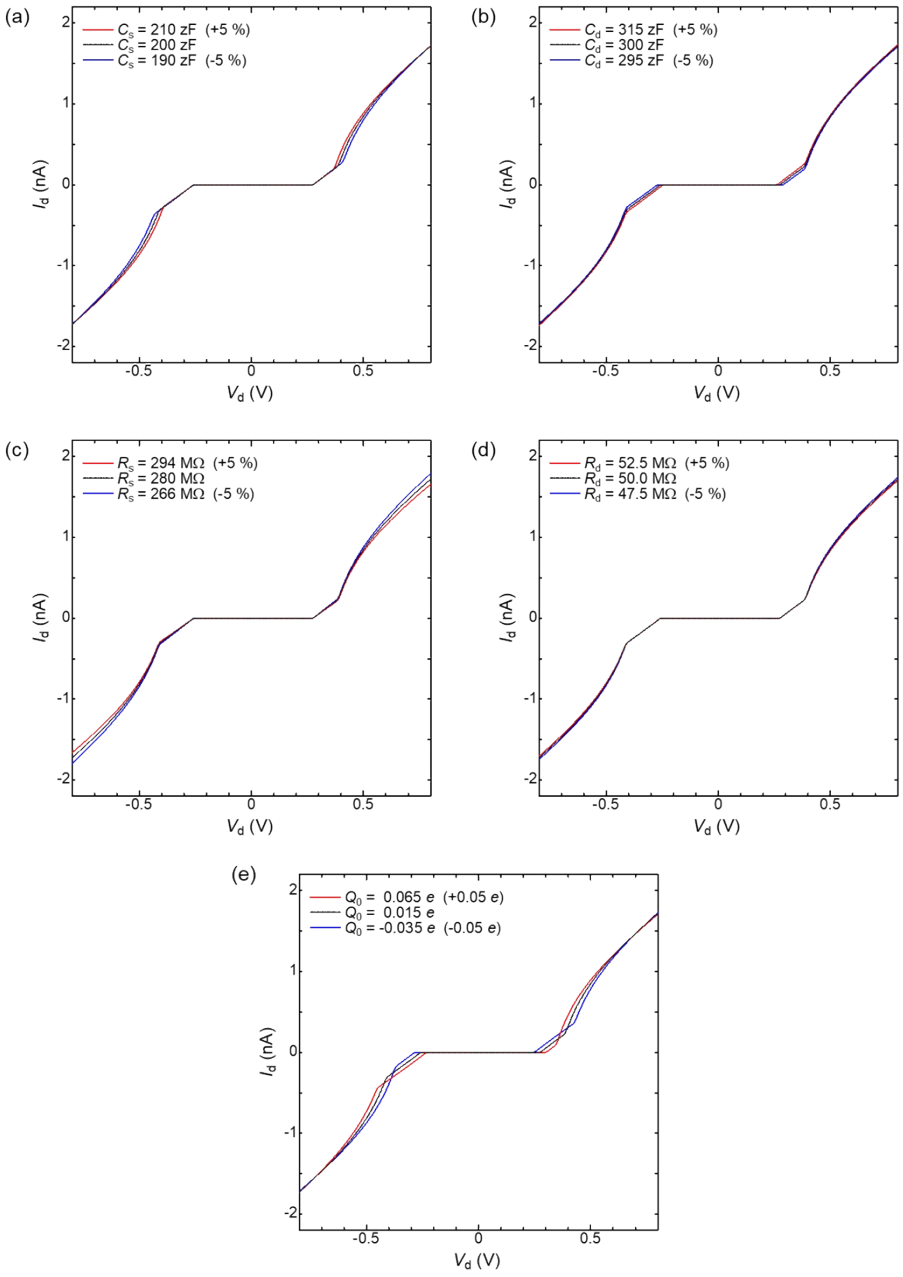

Figure S1. Comparison of theoretical I_{SET} - V_d curves where one of the 5 parameters is varied by ±5 % in (a) R_s, (b) R_d, (c) C_s, (d) C_d, and (e) Q_0, respectively.

Theoretical Resonant Tunneling Current $I_{RT} - V_d$ Curve on a single Quantum Dot Device

The resonant tunneling current I_{RT} is calculated by

$$I_{RT} = A\int_0^{V_d} \frac{1}{\sqrt{2\pi}\sigma} exp\left\{-\frac{(eV - \mu_{QD} - e\Delta V_{QD})^2}{2\sigma^2}\right\} dV. \#(S1)$$

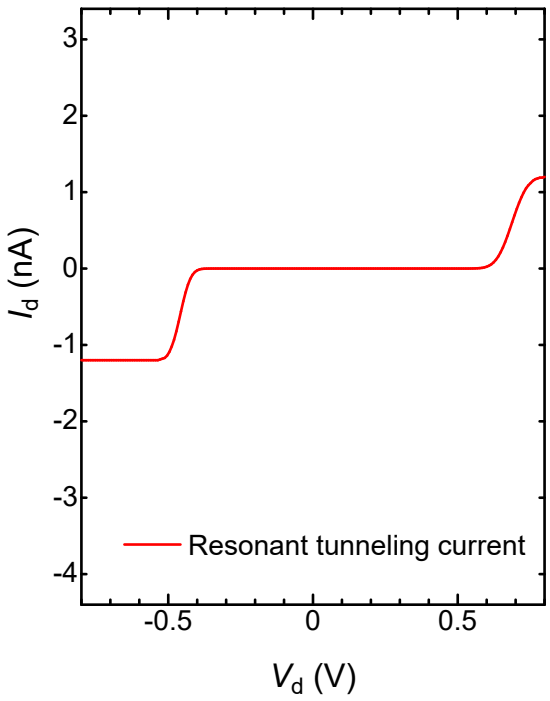

Figure S2. Theoretical resonant tunneling current $I_{RT} - V_d$ curve. Here, the fitting parameters are μ_{dot} = 0.275 eV, σ = 0.017 eV, and A = 1.2×10^{-9} A.