Electronic Supplementary Material (ESI) for Nanoscale.

Supporting information for

Probing the nanoscale Schottky barrier of metal/semiconductor interfaces of Pt/CdSe/Pt nanodumbbells by conductive-probe atomic force microscopy

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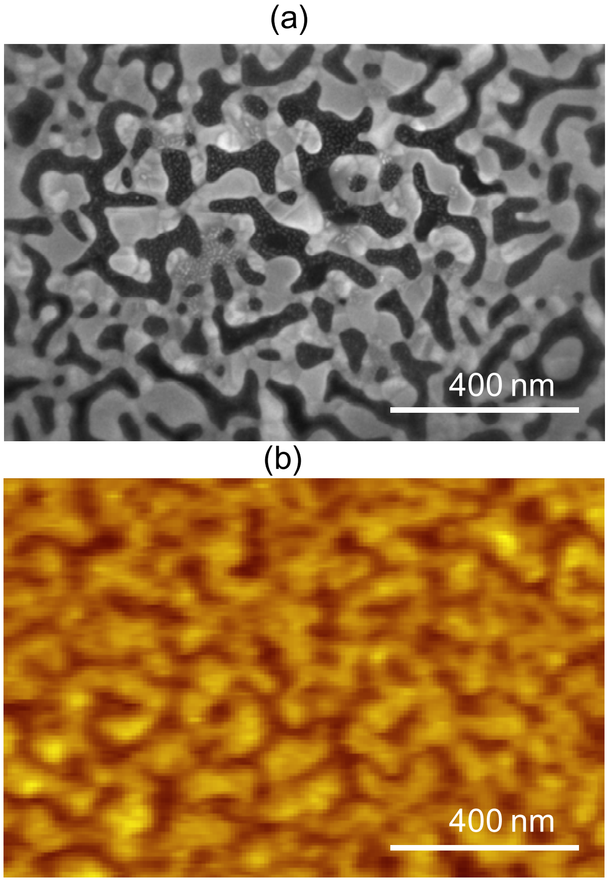

Figure S1 (a) SEM and (b) AFM topography images of nanodumbells on Au islands.

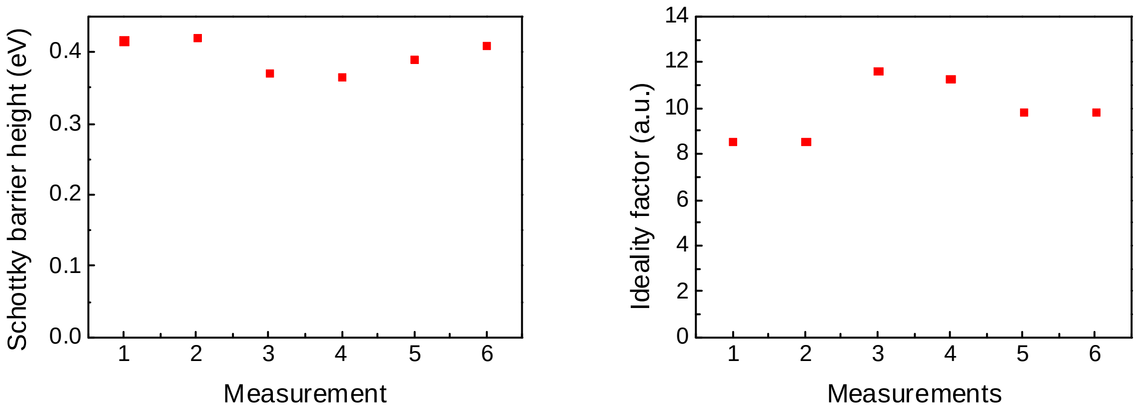

Figure S2 Multiple measurements of Schottky barrier heights and ideality factors measured on six Pt-CdSe-Pt nanodumbbells that give rise to 0.40 ± 0.02 eV and 9.9 ± 1.2, respectively.

Estimation of the contact area

To estimate contact area between AFM tip and sample, we used Derjaguin-Muller-Toporov (DMT) continuum mechanical model. The contact area, A, is given by

$$A = \pi \left\{ \frac{R}{K} (L + 2\pi R\gamma) \right\}^{2/3}$$

Where K is the reduced Young's modulus

$$\frac{1}{K} = \frac{3}{4} \left(\frac{1 - \nu_s^2}{E_s} + \frac{1 - \nu_t^2}{E_t} \right)$$

E_t and E_s are Young's moduli and ν_t and ν_s are the Poisson ratios of the tip and sample, respectively. (E_{TiN} = 600 GPa, ν_{tiN} = 0.25, E_{CdSe} = 8 GPa, ν_{CdSe} = 0.3) R is the tip radius (~ 35 nm) and L is applied load (~ 0 nN). 2πRγ is adhesion force (15.2 ± 1.2 nN) between tip and sample related to the work of adhesion, γ.