*nanomaterials*

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*Supplementary Materials*

# Fabrication of Silicon Nanowire Sensors for Highly Sensitive pH and DNA Hybridization Detection

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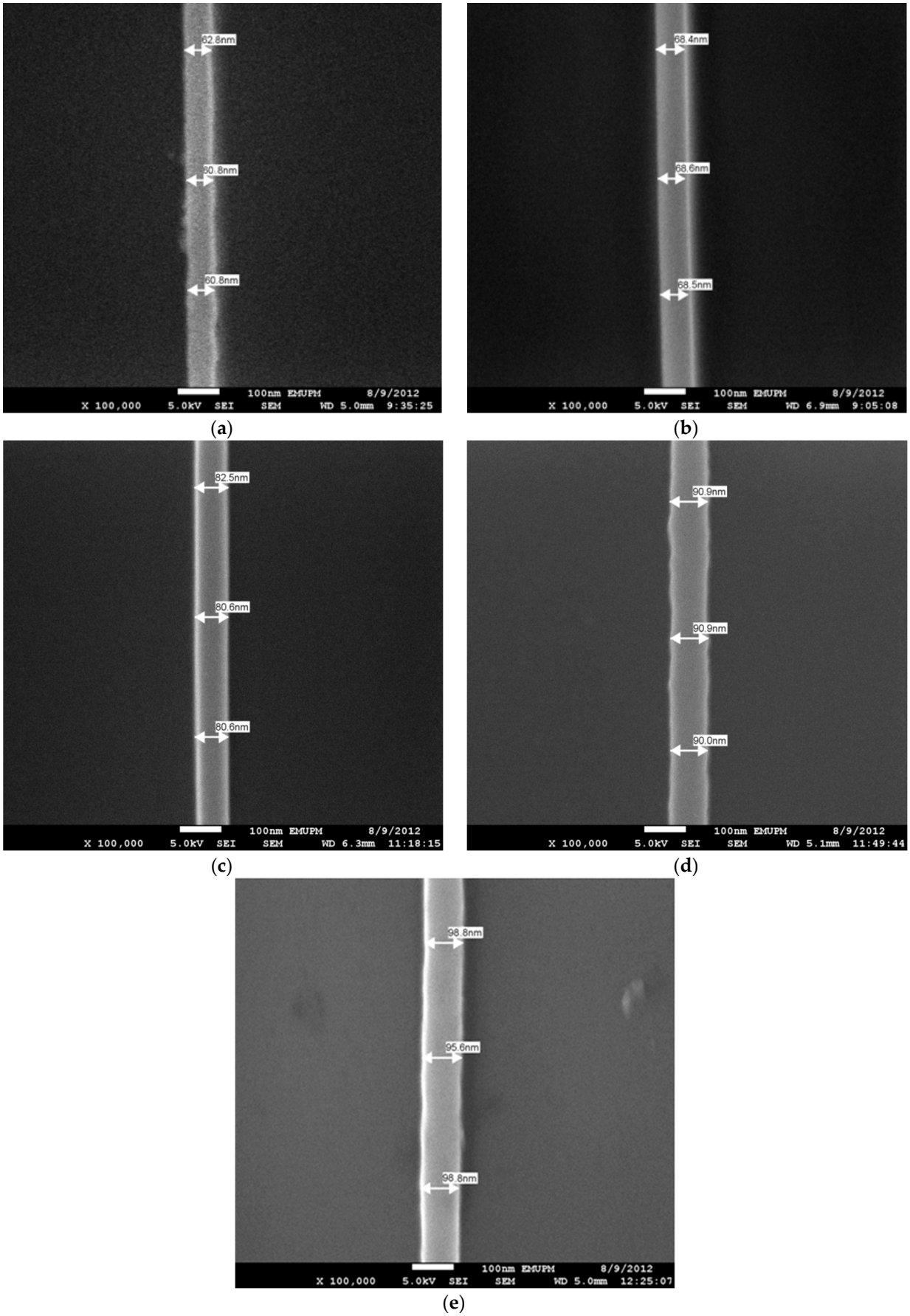


**Figure S1.** FESEM images of SiNWs with diameter of approximately (**a**) 60 nm, (**b**) 70 nm, (**c**) 80 nm, (**d**) 90 nm and (**e**) 100 nm at 100 KX magnification.

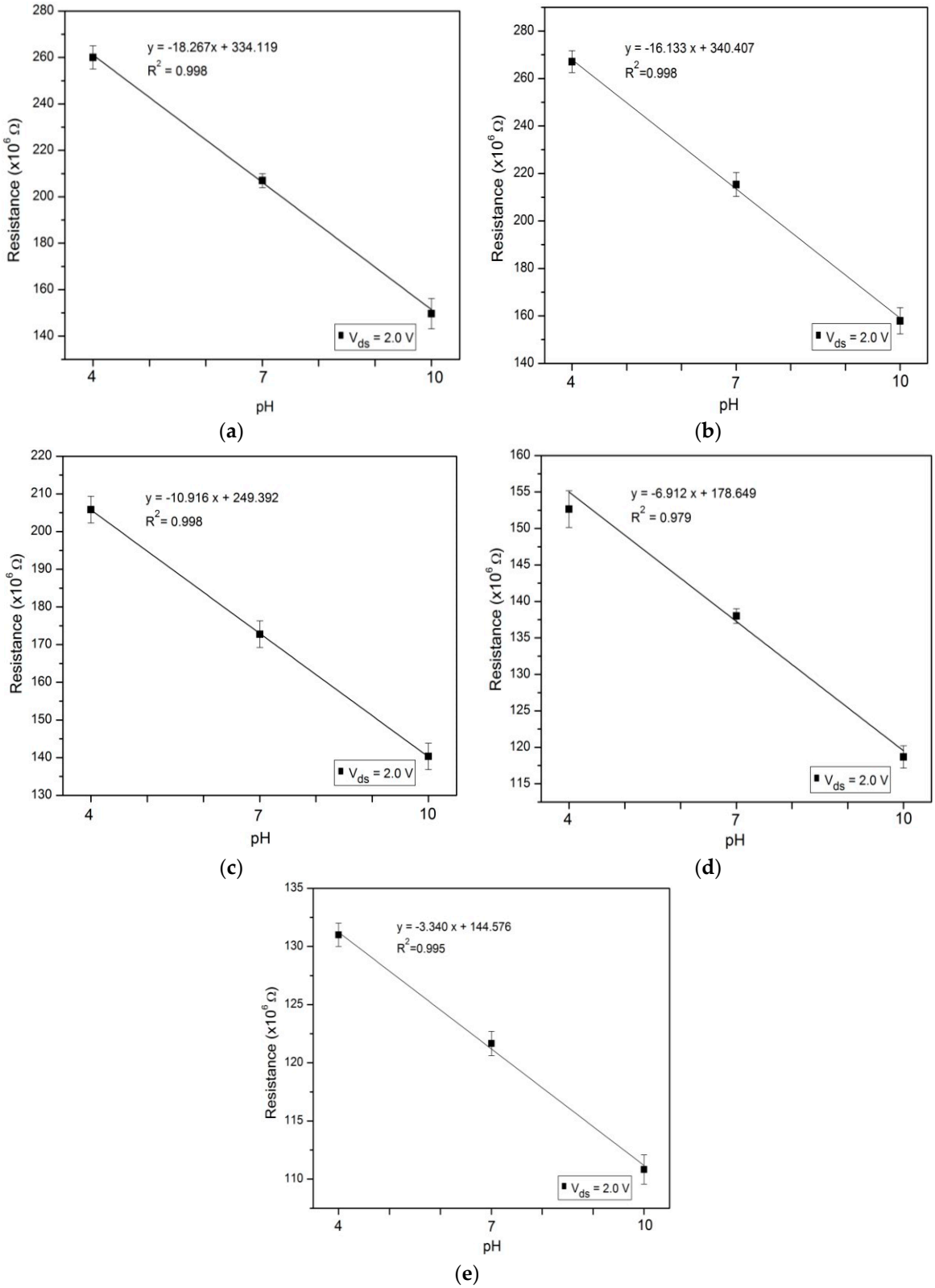


**Figure S2.** The devices consist of SiNW with (**a**) 60 nm width, (**b**) 70 nm width, (**c**) 80 nm width, (**d**) 90 nm width and (**e**) 100 nm width shows the highest resistance value at pH 4 and lowest resistance value at pH 10 with linear relationship between pH level and resistance measurement at 2V, respectively.

**Table S1.** Effect of SiNW width on detection response.

| pH | SiNW width (nm) | Average resistance (MΩ) | | ΔR/R0 (%) |
|---|---|---|---|---|
| | | R0 (APTES) | ΔR | |
| 4 | **60** | 1013.0 | 753.0 | 74.3 |
| | **70** | 725.0 | 456.7 | 63.0 |
| | **80** | 450.0 | 243.4 | 54.0 |
| | **90** | 255.0 | 102.5 | 40.1 |
| | **100** | 172.0 | 40.3 | 23.4 |
| 7 | **60** | 1013.0 | 806.2 | 79.6 |
| | **70** | 725.0 | 508.8 | 70.2 |
| | **80** | 450.0 | 276.8 | 61.5 |
| | **90** | 255.0 | 118.0 | 46.3 |
| | **100** | 172.0 | 50.5 | 30.0 |
| 10 | **60** | 1013.0 | 863.2 | 85.2 |
| | **70** | 725.0 | 566.2 | 78.0 |
| | **80** | 450.0 | 310.0 | 69.0 |
| | **90** | 255.0 | 136.0 | 53.3 |
| | **100** | 172.0 | 62.0 | 36.0 |

**Table S2.** Effect of SiNWs number on pH detection response.

| pH | SiNW number | Average resistance (MΩ) | | S=ΔR/R0 (%) |
|---|---|---|---|---|
| | | R0 (APTES) | ΔR | |
| 4 | **1** | 1013.0 | 753.0 | 74.3 |
| | **10** | 504.0 | 344.0 | 68.3 |
| | **20** | 312.0 | 200.0 | 64.1 |
| 7 | **1** | 1013.0 | 806.2 | 79.6 |
| | **10** | 504.0 | 371.2 | 73.7 |
| | **20** | 312.0 | 223.3 | 71.6 |
| 10 | **1** | 1013.0 | 863.2 | 85.2 |
| | **10** | 504.0 | 402.2 | 79.8 |
| | **20** | 312.0 | 245.0 | 78.5 |