Supporting Information for

High-performance Near-infrared Photodetector Based on Single-crystalline InGaAs Nanowires

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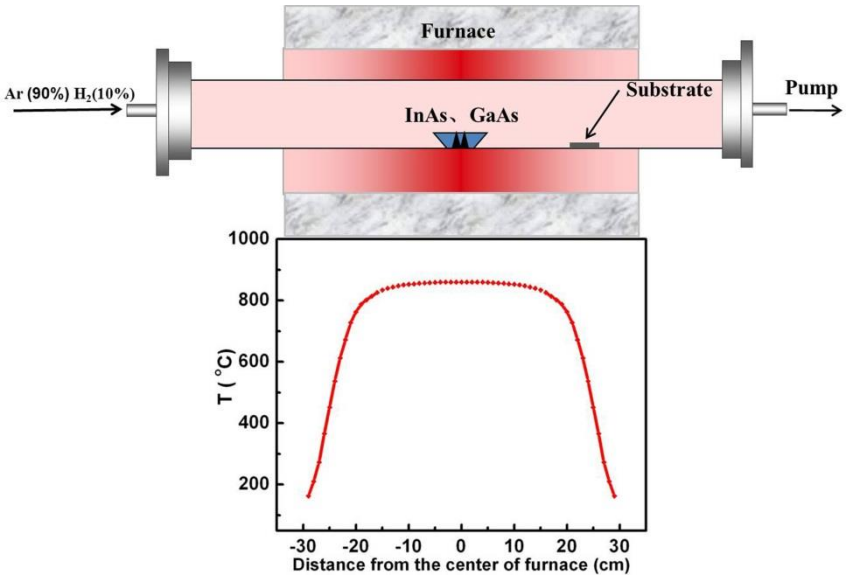

Fig. S1 Schematic diagram of the experimental setup and the temperature gradient in the furnace. The temperature profile of tube furnace was measured with thermocouples

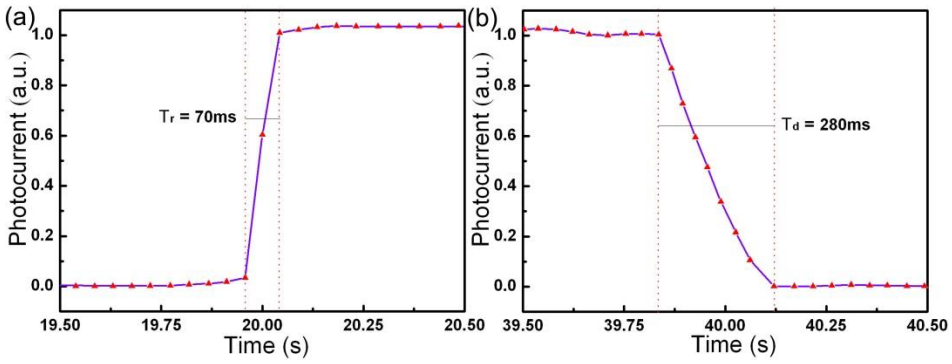

Fig. S2 (**a, b**) The detailed curves of photocurrent changing with time.

The Temperature-dependent Bandgap of $In_{0.65}Ga_{0.35}As$ NWs

The temperature-dependent bandgap values of GaAs and InAs can be calculated from the two equation, respectively [1, 2]:

$$E_g(T) = 0.415 - \frac{2.76\times10^4 T^2}{T+83} \quad (1)$$

$$E_g(T) = 1.515 - \frac{5.5\times10^4 T^2}{T+255} \quad (2)$$

The theoretical bandgap of $In_xGa_{1-x}As$ can be given by the following equation:

$$E_g(In_xGa_{1-x}As) = E_g(InAs)x + E_g(GaAs)(1-x) - 0.436x(1-x) \quad (3)$$

The Varshni's empirical relation of a typical semiconductor [3]:

$$E_g(T) = E_g(0K) - \alpha T^2/(T+\beta) \quad (4)$$

According to these four equations, the bandgap of $In_{0.65}Ga_{0.35}As$ can be calculated as:

$$E_g(In_{0.65}Ga_{0.35}As, T) = 0.7008 - \frac{3\times10^4 T^2}{T+105} \quad (5)$$, as shown in Fig. 3b.

References

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[3] Y.P. Varshni, Temperature dependence of the energy gap in semiconductors. Physica **34**(1), 149-154 (1967). doi:10.1016/0031-8914(67)90062-6