Supplementary Information

Gold Nanorod-based Photo-PCR System for One-Step, Rapid Detection of Bacteria

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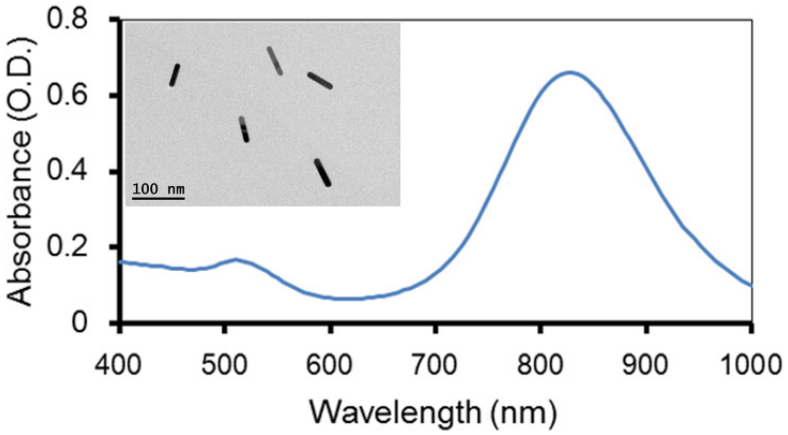

Figure S1. UV/Vis absorption spectrum of PEG-GNRs. Inset: transmission electron microscopic image of PEG-GNRs.

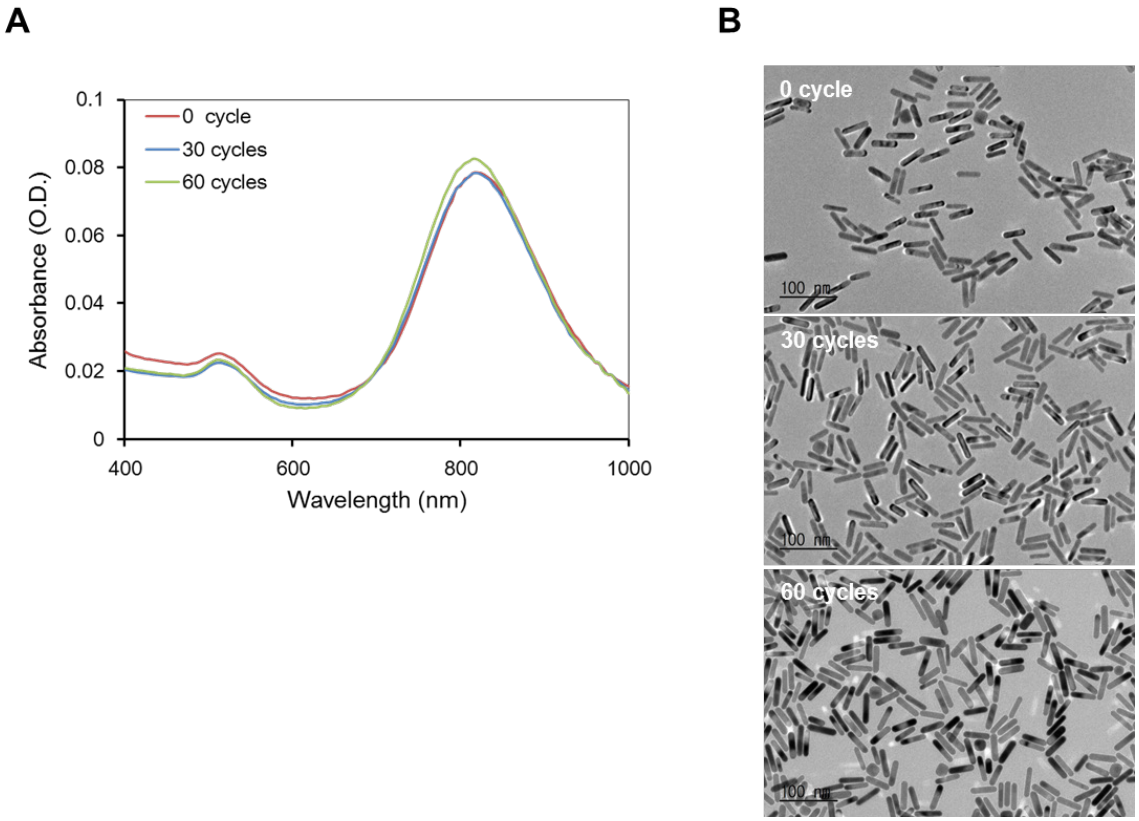

Figure S2. Thermal stability of PEG-GNRs in pure water. (A) UV/Vis absorption spectra and (B) transmission electron microscopic images of PEG-GNRs before and after thermal cycling. Thermal cycling was performed under the conditions of 30 cycles and 60 cycles of 50 °C to 85 °C.

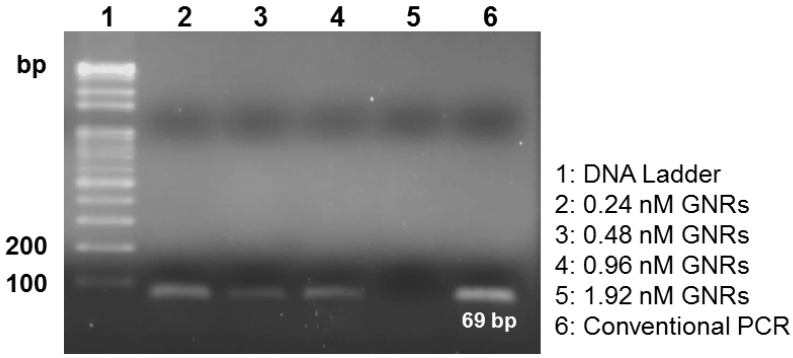

Figure S3. Effect of PEG-GNR concentration on photo-PCR using *S. aureus* genomic DNA (gDNA). Gel electrophoresis results demonstrate the dependence of yield on PEG-GNR concentration.

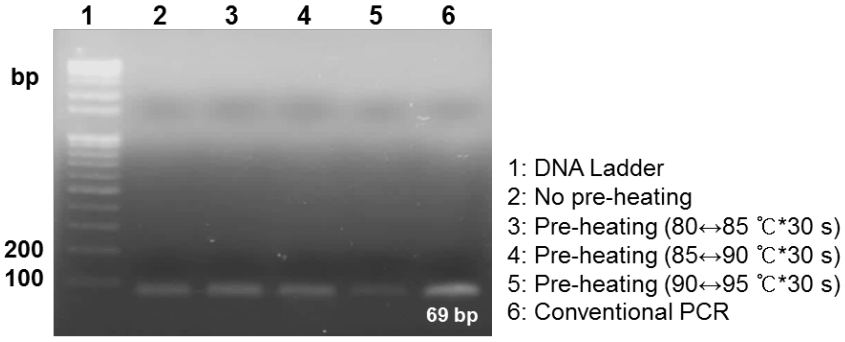

Figure S4. Effect of pre-heating temperature on photo-PCR using *S. aureus* genomic DNA (gDNA). Gel electrophoresis results demonstrate the dependence of yield on pre-heating time.

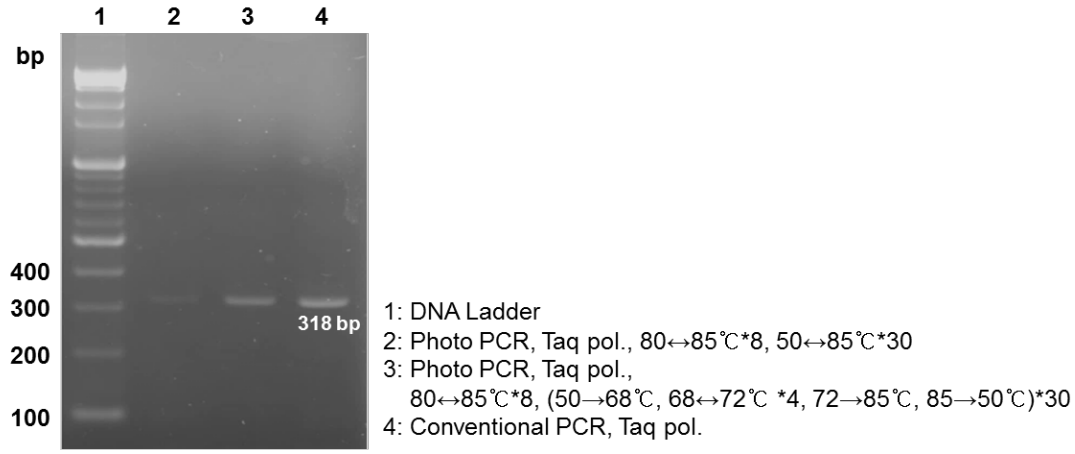

Figure S5. Amplification of human β-actin gene (318 bp) using cDNAs of HeLa cells as templates. Photo-PCR with Taq polymerase under the thermal cycling between two temperatures (50 ℃↔ 85 ℃) or under the extended thermal cycling with additional elongation cycles (4 times of 68 ℃↔72 ℃ between 50 ℃ and 85 ℃). Gel electrophoresis results show the yields of amplicons under the different PCR conditions.

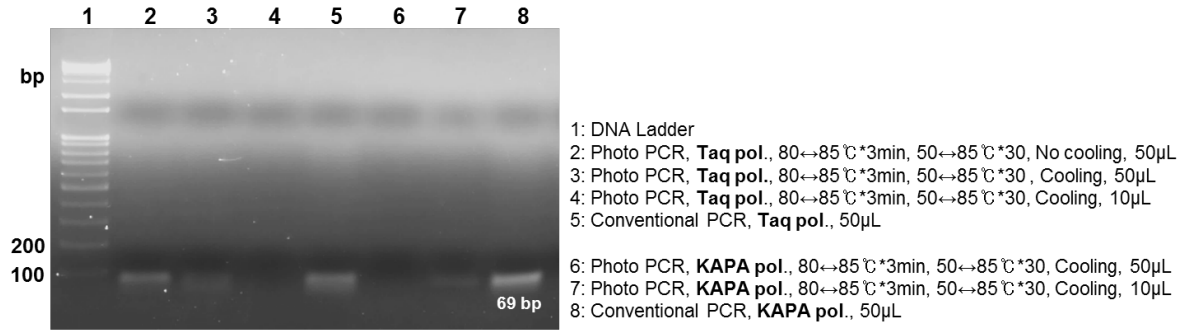

Figure S6. Rapid one-step photo-PCR using Taq polymerase or KAPA2G Fast PCR polymerase with different total volumes. Gel electrophoresis results show the yields of amplicons for each sample.

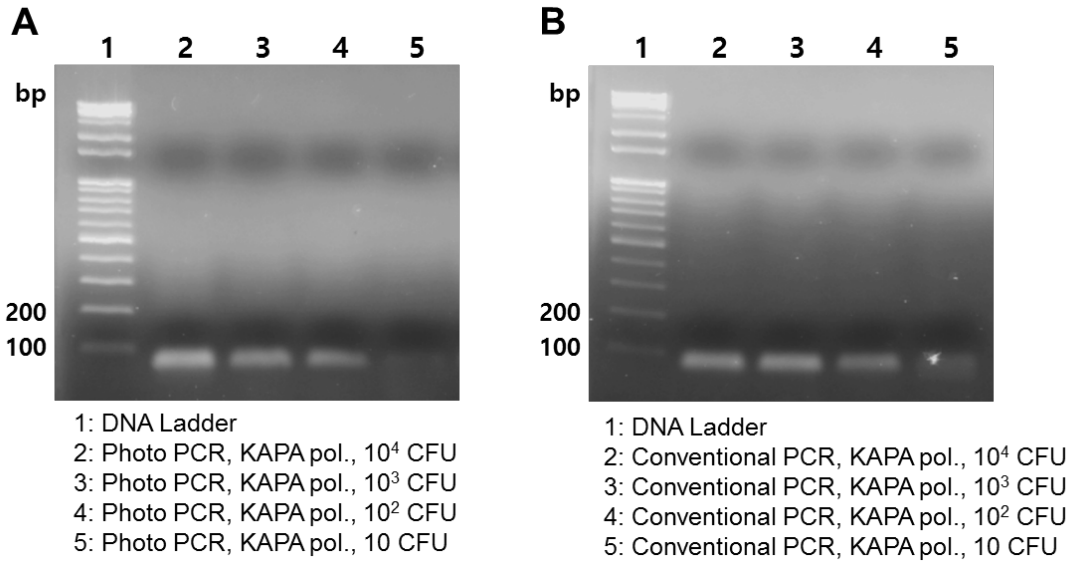

Figure S7. Sensitivity test of photo-PCR (A) and conventional PCR (B) using *S. aureus* ranging from 10 to 10^4 CFU. KAPA2G Fast PCR polymerase was used for both PCR systems.

Table S1. Cycling time profile for photo-PCR with different PEG-GNR concentrations

GNR concentration (nM)	Heating (s)	Cooling (s)	Total thermal cycle (min)
0.072	15.3	60.9	42.1
0.24	9.4	57.6	38.0
0.72	7.1	54.7	33.3
2.16	5.0	44.3	26.0