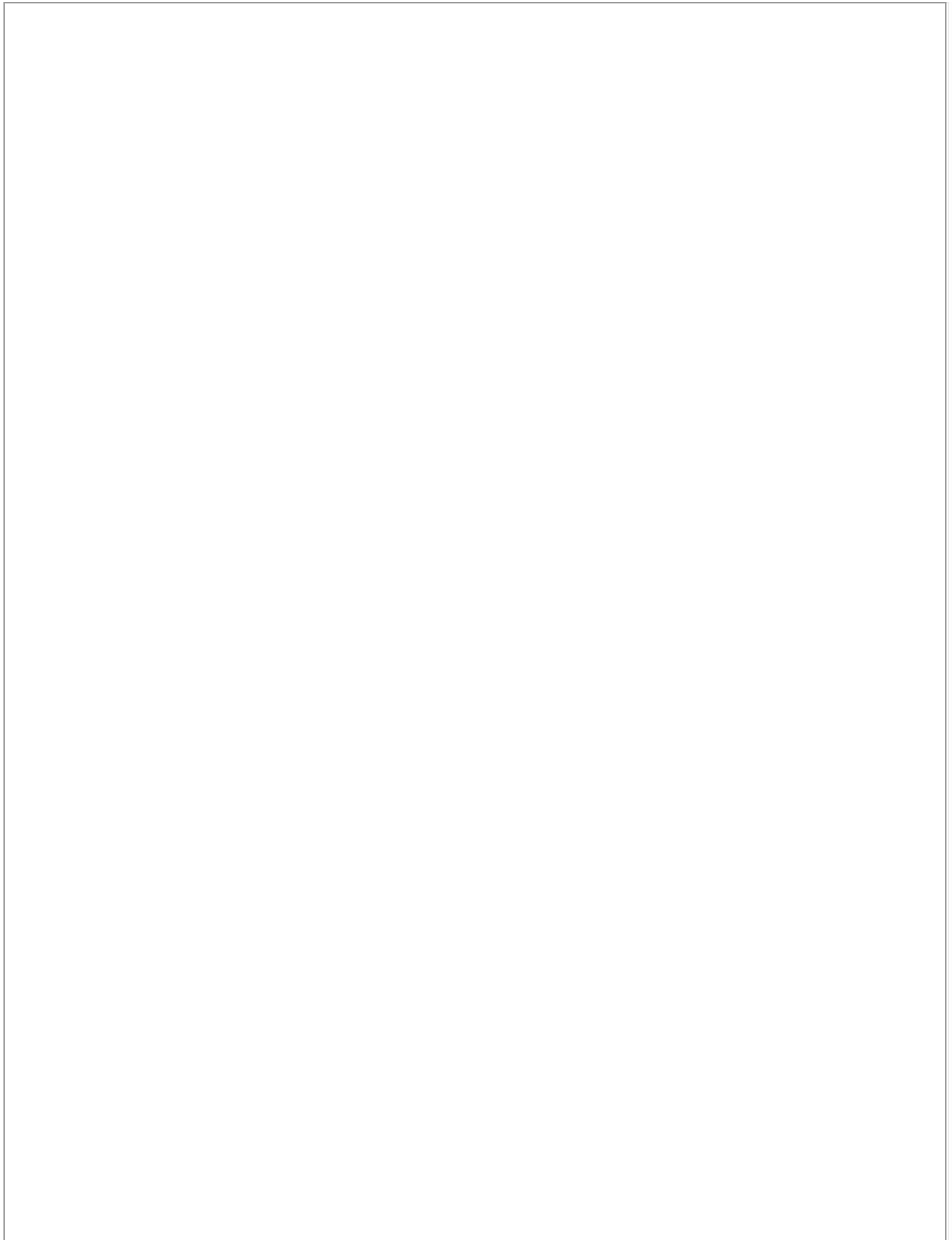


Documents



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EARLIER DENATURATION OF DNA BY USING NOVEL TERNARY HYBRID NANOPARTICLES

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Abstract

Two novel ternary hybrid nanoparticles (THNp) consisting of graphene oxide (GO) and reduced graphene oxides (rGO) were added to samples of DNA. The effect of the addition of nanoparticles on the thermal denaturation of DNA samples was studied by measuring the absorbance using a temperature-controlled Perkin Elmer UV spectrophotometer. Adding GO-TiO₂-Ag and rGO-TiO₂-Ag nanoparticles lowered the denaturation temperature of template DNA significantly. The nanoparticles affect the denaturation rate. The optimal GO-TiO₂-Ag and rGO-TiO₂-Ag concentrations were found to be 5 × 10⁻², which resulted in 86-and 180-folds augmentation of DNA denaturation (6.5 µg/mL), respectively, while it resulted in 2- and 7-folds augmentation of DNA denaturation (11.5 µg/mL), respectively, at temperature as low as 80 °C. The results indicated that rGO-TiO₂-Ag nanoparticles exhibited significantly higher DNA denaturation enhancement than rGO-TiO₂-Ag nanoparticles, owing to their enhanced thermal conductivity effect. Therefore, these nanoparticles could help to get improved PCR yield, hence enable amplification to be performed for longer cycles by lowering the denaturation temperatures. © 2022

Author Keywords

Dna denaturation; hybrid nanoparticles; nano-PCR; polymerase chain reaction (PCR)

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