[0004a] In one aspect, there is provided a method of amplifying a target nucleic acid in a sample, the method comprising, incubating said target nucleic acid in a reaction mixture comprising:

at least one primer,

an exonuclease deficient hybrid polymerase having portions of two parental polymerases, the exonuclease deficient hybrid polymerase comprising a polymerase domain and a heterologous DNA binding domain, wherein the polymerase domain is from a B family polymerase, and

a double-stranded DNA binding dye,

wherein said incubating is under conditions that permit amplification of said target nucleic acid by said hybrid polymerase; and

using quantitative polymerase chain reaction (qPCR) detection to monitor amplification of the target nucleic acid, wherein signal from the double-stranded DNA binding dye is detected in real-time;

thereby amplifying a target nucleic acid in a sample.

[0005] In one embodiment, the present disclosure provides a method of amplifying a target nucleic acid. This method includes incubating the target nucleic acid with a reaction mixture that includes at least one primer, a hybrid polymerase, and an osmolyte. In a further embodiment, the incubating step is conducted under conditions that permit amplification of the target

WHAT IS CLAIMED IS:

1. A method of amplifying a target nucleic acid in a sample, the method comprising, incubating said target nucleic acid in a reaction mixture comprising:

at least one primer,

an exonuclease deficient hybrid polymerase having portions of two parental polymerases, the exonuclease deficient hybrid polymerase comprising a polymerase domain and

a heterologous DNA binding domain, wherein the polymerase domain is from a B family polymerase, and

a double-stranded DNA binding dye,

wherein said incubating is under conditions that permit amplification of said target nucleic acid by said hybrid polymerase; and

using quantitative polymerase chain reaction (qPCR) detection to monitor amplification of the target nucleic acid, wherein signal from the double-stranded DNA binding dye is detected in real-time;

thereby amplifying a target nucleic acid in a sample.

2. The method of claim 1, wherein the reaction mixture comprises at least two primers that can form a primer dimer.

3. The method of claim 1, wherein the reaction is initiated with antibodies bound to the hybrid polymerase.

4. The method of claim 1, wherein the reaction mixture further comprises an additive selected from the group consisting of sarcosine and heparin, in a sufficient amount to improve efficiency of the amplification reaction by at least 10% compared to a reaction mixture lacking the additive.

5. The method of claim 1, wherein the hybrid polymerase comprises SEQ ID NO:2.

6. The method of claim 1, wherein the heterologous DNA binding domain is at least 75% identical to SEQ ID NO:3.

7. The method of claim 1, wherein the hybrid polymerase comprises a polypeptide sequence at least 90% identical to SEQ ID NO:2.