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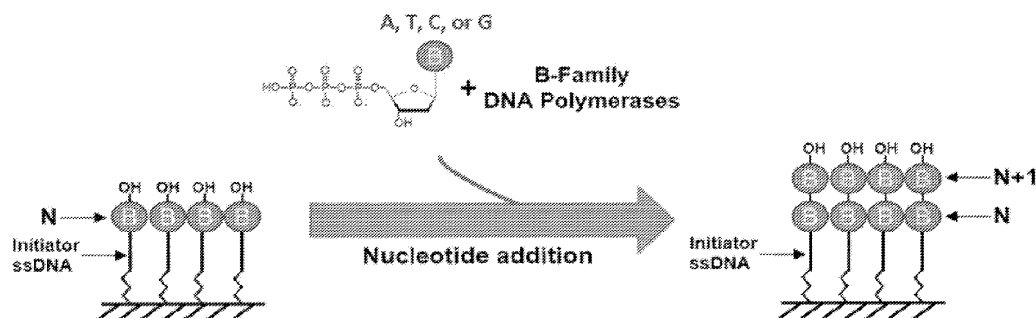


FIG. 1

(57) Abstract: A method for synthesizing a nucleic acid includes providing an initiator having an unprotected nucleoside base and a 3' hydroxyl group at a 3' terminus thereof, providing a nucleic acid polymerase having at least a conservative catalytic polymerase domain of a family-B DNA polymerase, providing a nucleotide monomer, and exposing the initiator to the nucleotide monomer in the presence of the nucleic acid polymerase and at least one type of metal cofactors which are divalent cations, and in the absence of a template, such that the nucleotide monomer is incorporated to the initiator. A kit includes the initiator, the nucleic acid polymerase, the nucleotide monomer, and the at least one type of metal cofactors, and is used according to the method.



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