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METHODS AND DEVICES FOR NON-ENZYMATIC NUCLEIC ACID SYNTHESIS

Tech ID: 34332 / UC Case 2018-399-0

BACKGROUND

Nucleic acids such as DNA and RNA find many different applications in research. They can act as research reagents, diagnostic agents, therapeutic agents, and more. Nucleic acids are made by enzymes, which are macromolecules that catalyze reactions. Since nucleic acids are so frequently used in research, there is continued interest in finding new and improved ways to synthesize them. Researchers at UC Santa Cruz have developed ways to continuously synthesize nucleic acids without the use of enzymes.

TECHNOLOGY DESCRIPTION

The methods and devices are based on the ability to non-enzymatically synthesize nucleic acids by dehydrating a reaction mixture that includes an organizing matrix reagent and monophosphate nucleotides, where the dehydrating drives the synthesis reaction. The cylinder of the device dips into the reaction mixture, then rotates so that there is a thin film on the cylinder. This process is enhanced when the organizing matrix reagent is made of amphiphilic compounds that organize the mononucleotides into multilamellar sheets, or when the organizing matrix reagent is made of monovalent salts like ammonium chloride.

Heating and drying the thin film allow phosphodiester bonds to form between the monophosphate nucleotides. From there, the nucleic acids product can be captured by several means.

APPLICATIONS

- ▶ nucleic acid synthesis

ADVANTAGES

- ▶ continuous polymerization without the need for enzymes

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	12,325,011	06/10/2025	2018-399

Additional Patent Pending

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- ▶ [Non-enzymatic Synthesis of RNA and Nucleic Acid-like Polymers](#)

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OTHER INFORMATION

KEYWORDS

nucleic acid, polymerization

CATEGORIZED AS

- ▶ **Materials & Chemicals**
 - ▶ Biological
 - ▶ Chemicals
- ▶ **Medical**
 - ▶ Research Tools
- ▶ **Research Tools**
 - ▶ Nucleic Acids/DNA/RNA
 - ▶ Other
 - ▶ Reagents

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