

MICROFLUIDIC DEVICE AND METHOD OF MANUFACTURING THEREOF IITM Technology Available for Licensing

PROBLEM STATEMENT

- In the present era, it is noted that there are significant challenges in the ultra-purification of blood associated with the device used in the diffusion process, being bulky, time-consuming, and **involving high cost**.
- The present invention addresses the **technical problem** stating **how to provide bio-compatible microfluidic devices** for **ultra-purification** of blood that overcome the limitation of ionic imbalance and also a method of fabrication of the micro-features of the microfluidic devices using high-quality masters.
- Hence, the present invention provides the solution to the above issues in an efficient manner.

INTELLECTUAL PROPERTY

IITM IDF Ref. 2289; IN Patent No: 469660

TECHNOLOGY CATEGORY/MARKET

Technology: Microfluidic Device.

Industry: Pharmaceutical, Medical device.

Applications: Medical Device.

Market: The global microfluidics market is projected to grow at a **CAGR** of **12.22%** during **2024-2030**.

TRL (TECHNOLOGY READINESS LEVEL)

TRL-3/4, Proof of Concept ready, tested in lab.

TECHNOLOGY

- The present invention describes a **microfluidic device** which operates on deterministic lateral displacement through micropillars **which is used to separate blood cells from plasma**.
- Further present invention discloses about the **fabrication of polymeric bio microfluidic devices** for ultra purification of blood, i.e. application of femtosecond lasers for the fabrication of the masters.
- The **microfluidic device** comprises at least **one deterministic Lateral Displacement (DLD) assembly** for filtering one or more constituents in the bloodstream.

- The DLD assembly comprises **micro-structures formed in micro-channels**.
- The **bloodstream** passing through the micro-structures is separated into a **first bloodstream** comprising **blood plasma with potassium (K⁺) ions** and a **second bloodstream** containing **blood cells**.
- A **diffusion assembly** comprises a **buffer inlet** for intake of a **buffer solution containing sodium (Na⁺) ions**, a **cellulose membrane** receiving the **buffer solution** and the **first bloodstream**.

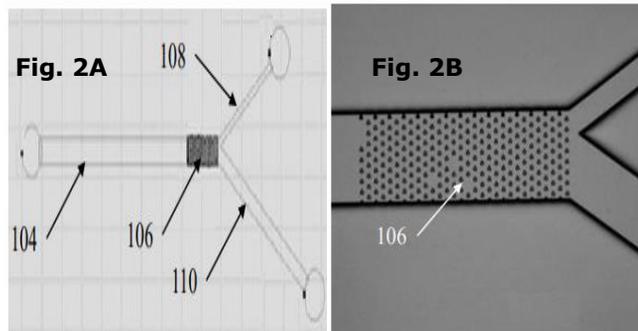
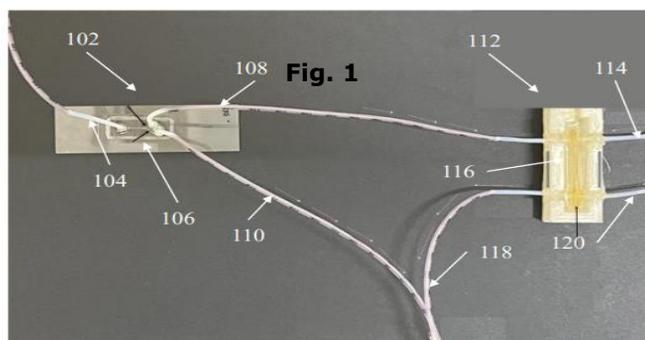


Fig. 1: Illustrates the claimed microfluidic device **Fig. 2A, 2B** Illustrates the configurational view of Deterministic Lateral Displacement (DLD) assembly;

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KEY FEATURES / VALUE PROPOSITION

❖ Technical Perspective:

- Provides a **low-cost** & **portable microfluidic device** for ultra-purification of blood, and method of fabrication thereof.
- Provides a **method of fabrication** of micro-features of the microfluidic device using high-quality masters.
- Fabricate a **microfluidic device** for **efficient** ionic separation in fluids, such as blood, to maintain ionic balance in the bloodstream.

❖ Industrial Perspective:

- Fabricate **cost-effective** **high throughput** and **bio-compatible microfluidic device** for **ultra-purification** of **blood** and **method** of fabrication thereof.

IMAGE

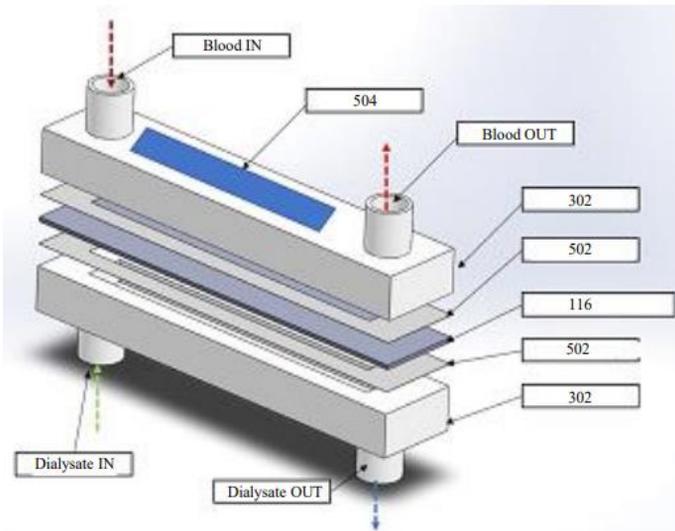


Fig.3 Illustrates a schematic representation of a stacked module comprising a plurality of microfluidic devices.

Configurational Image

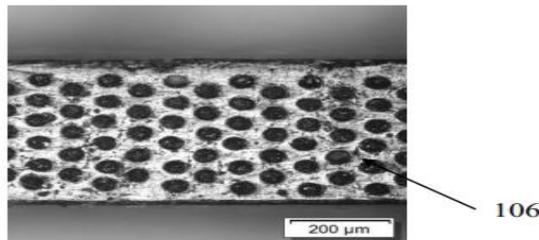


Fig. 4A

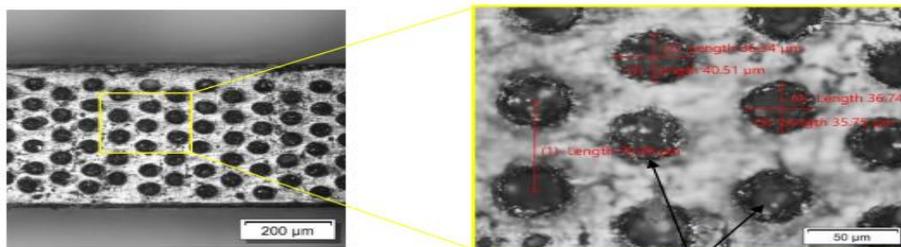


Fig. 4B

Figs. 4A-4B: Illustrates the microscopic images showing micro-structures formed in the DLD assembly.

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