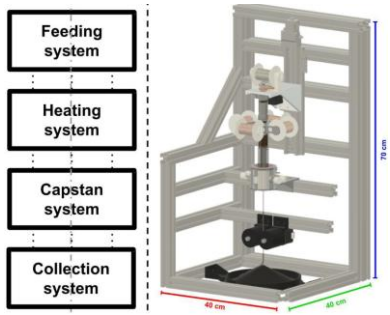
Tohoku Univ. Technology

3D Spiral Micromixer

Fluids can be well mixed by using a helical flow channel inside a microfiber



Miniature Rotary/Sweeping Thermal Drawing Press (mini-r/sTDP) Device

Overview

Conventional microfluidic devices are typically manufactured on flat substrates using lithography—a standard semiconductor fabrication technique. However, this traditional approach is largely limited to two-dimensional (planar) channel structures, making it difficult to create complex, three-dimensional fluid paths.

To overcome these limitations, the inventors developed a **Rotary Thermal Drawing System**. This breakthrough device enables the production of **hollow spiral microfibers** with complex 3D structures. By leveraging this technology, the inventors have successfully designed a highly efficient **Micromixer** that uses internal helical channels to achieve uniform mixing of fluids, such as chemicals and reagents.

Key Technical Advantages:

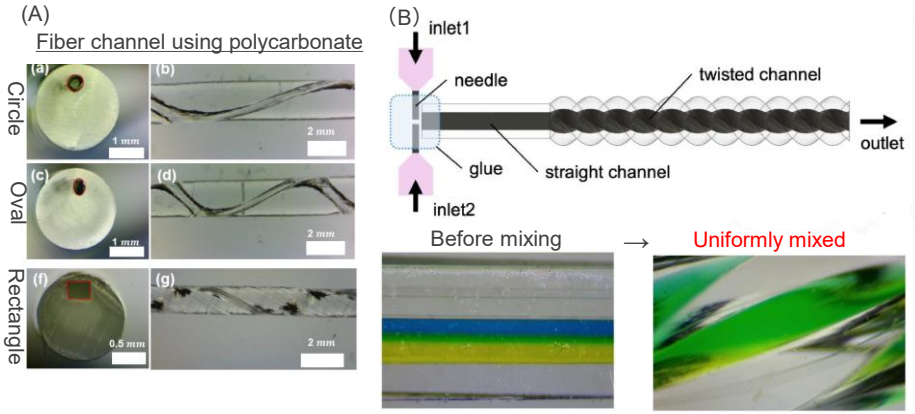
・**Flexible design is possible**: the fiber material (e.g. high-strength material, elastic materials), diameter size, pitch, shape (liner or spiral), hollow or not, etc.

・**Portable size of the equipment**: Saving space and easy to handle.

Potential Applications

- ☐ A classification and separation device for cells, particles, or microorganisms.
- ☐ A compact micromixer of mixing solutions for lab-on-a-chip applications or point-of-care testing
- ☐ **Tailored to your specific needs. Contact us to discuss your potential application.**

Prototyping and Mixing Performance of the Micromixer



(A) Prototype Fabrication & Evaluation: Successfully produced fibers with diverse helical channel configurations.
(B) Superior Mixing Results: Effective mixing was observed within a flow path of just a few millimeters, proving its viability for compact drug/reagent mixing applications.

IP Data

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