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Chemical and biochemical analysis on lab-on-a-chip devices fabricated using three-dimensional printing

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Highlights

- The attractive properties of 3D printing technology were described.
- Three represent printing technologies were compared.
- Chemical and biochemical analysis of 3D printed lab-on-a-chip devices were discussed.
- Challenges and future opportunities of 3D printed chip devices were summarized.

Abstract:

Recently, the unique capability of three-dimensional (3D) printing strategy for patterning micro-sized features with complex 3D architectures in a single process has caught an ever increasing interest within the domain of lab-on-a-chip devices. In this review, the latest advances in the **constucting development** of 3D microfluidic devices with 3D printing technologies in **analytical application** were summed up. To begin with, the attractive properties of 3D printing technologies were described. Then, the principles of three mainly printing technologies were introduced in detail. **The stimulating progress related to applications of 3D printed lab-on-a-chip devices was subsequently dealt with.** Finally, the challenges and opportunities in regard to numerous aspects of 3D printing microfluidic system were discussed. It is believed that **higher resolution, more user-frinendly operation** endows 3D printed lab-on-a-chip devices with great potential academic and commercial value **in on-site environmental monitoring, food safety, and other point-of-care assay.**

Keywords: Lab-on-a-chip devices; Three-dimensional printing; **Chemical analysis; Biochemical analysis; Sample pre-treatment**

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