Microfabricated Devices for the Acquisition of Chemical and Biochemical Information

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The ability to sculpt microscopic features into planar solid state substrates emerged as a discipline known as micromachining in the late 1970's. Micromachining is a spin-off from the microelectronics community and thus uses similar principles for construction. Fabrication capabilities have continued to grow over the past two decades producing many intriguing actuator assemblies including miniature motors, tweezers, accelerometers, and pressure sensors. There has also been increasing interest in microscale chemical preparation and analysis procedures over the same time span. Most of these efforts have employed manual procedures coupled to large scale instruments that can address small samples. It now appears feasible to consider using micromachining technology to fabricate miniature chemical instruments and possibly miniature chemical laboratories. Realization of these micro-laboratory components could allow a paradigm shift for chemical and biochemical synthesis and analysis similar to that provided to electronics by the transistor and integrated circuit. The design, development, and use of such integrated microdevices for acquiring chemical and biochemical information will be discussed.

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