analysis via the dispensing unit. Each droplet may be presented to a mass spectrometer and a characteristic of each droplet determined by means of mass spectrometry. Analyzing a characteristic of each droplet may include heating each droplet, or applying a pneumatic or explosive force to each droplet, so as to form an atomized spray and determining a characteristic each droplet by means of mass spectrometry. Each droplet may be vibrated so as to cause atomization, whereupon a characteristic of each droplet can be determined by means of mass spectrometry. Vibrating the droplet may include focusing a pulsed laser onto the surface or backside of the surface in a proximity of each droplet, utilizing acoustic waves, or mechanically vibrating the surface. A voltage to the surface onto which each droplet is deposited may be applied to assist in the formation of atomized spray.

[0010] In further related embodiments, the moving surface may be a conveyor belt, fiber, or timing belt. The moving surface may be unperforated. A laminate may be applied to the moving surface prior to dispensing each droplet onto the moving surface. In various embodiments, the laminate is spooled onto the moving surface, whereupon at least one operation may be performed on each droplet. The laminate may then be spooled off of the moving surface. At least one surface property of the laminate may be customized from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity, chemical interaction, chemical addition, sample information encoding, and tracking. Each droplet may have a specified volume smaller than one microliter.

[0011] In another embodiment of the invention, a method and system of high throughput processing of a plurality of droplets includes hanging each droplet from a dispenser. Each droplet is brought into momentary contact with a moving surface having a probe, such that each droplet is deposited onto the probe through surface attraction. An alternating current is applied to the probe so as to cause the probe to vibrate such that each droplet is atomized and a characteristic of each droplet analyzed.

[0012] In yet another embodiment of the invention, a method and system of high throughput processing of a plurality of droplets includes dispensing each droplet into an enclosed volume, the enclosed volume having an exit channel, the enclosed volume incorporated into a moving conveyer. Each droplet is heated in the enclosed volume such that the expansion of the droplet causes it to be ejected through the exit channel in the form of an atomized spray. The characteristics of the atomized spray are then analyzed by means of mass spectrometry.

[0013] In another embodiment of the invention, a method and system for high throughput screening of a plurality of droplets includes spooling a laminate onto a moving surface. Each droplet is dispensed onto the laminate. At least one operation is performed on each droplet from the group of operations consisting of mixing, diluting, concentration, heating, cooling, humidifying, filtering, and analyzing. The laminate may then be spooled off the moving surface.

[0014] In related embodiments, the step of spooling may include depositing the laminate onto a conveyor belt. The method and system may further include cleaning the laminate and repeating the steps of spooling the laminate onto the moving surface, dispensing, performing on each droplet at least one operation, and spooling the laminate off the moving surface. The laminate may be disposed of after use. At least one surface property of the laminate may be customized from the group of surface properties consisting of cleanliness, biocompatibility, surface energy, binding affinity, porosity, chemical interaction, chemical addition, sample information encoding, and tracking. The laminate may be magnetic and the droplet may include magnetized particles. Each droplet may be to a controlled environment. At least one droplet in the controlled environment may hang from the laminate for at least a specified minimum period of time, the droplet adhering to the laminate through, at least in part, surface tension. Each droplet on the laminate may be transported, by virtue of motion of the movable surface, through an environmentally controlled delay line prior to performing the at least one operation on each droplet. The moving surface may be a timing belt. The moving surface may move continuously or in a discontinuous start/stop action. The laminate surface may be unperforated. Analyzing may include performing at least one operation from the group of operations consisting of optical interrogation and mass spectrometry. Optical interrogation may include applying at least one of fluorescence spectrometry, Raman spectroscopy and UV absorption. Analyzing may also includes hanging each droplet from the laminate for at least some period of time, the droplet adhering to the laminate through, at least in part, surface tension. Each droplet may be tracked on the moving surface.

[0015] In yet another embodiment of the invention, a method and system for high throughput processing of a plurality of droplets includes dispensing a plurality of droplets onto a substantially unperforated surface. The surface is then moved through a delay line such that each droplet hangs from the surface for at least a period of time, wherein the force acting to counter gravity is predominantly non-shearing.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The invention will be more readily understood by reference to the following description, taken with the accompanying drawings, in which:

[0017] **FIG. 1** is a schematic of a high throughput screening system according to one embodiment of the present invention;

[0018] **FIG. 2** is a schematic of a wound tape with through holes in accordance with one embodiment of the present invention;

[0019] **FIG. 3** is a schematic of a system for dispensing droplets on a tape with through holes in accordance with one embodiment of the present invention;

[0020] **FIG. 4** is a schematic of a system for transferring fluid from a pin array to through holes on a wound tape in accordance with one embodiment of the present invention;

[0021] **FIG. 5** is a schematic of a front view of a syringe bank in accordance with one embodiment of the present invention;

[0022] **FIG. 6** is a schematic of a side view of a syringe bank in accordance with one embodiment of the present invention;