polished with 1 micron diamond particles to provide a close to mirror finish for the nozzle that is formed as part of the microfluidic device. The microfluidic device is fabricated by injecting polybutyl terephthalate (PBT) into the closed mold and then curing the formed structure and then ultimately removing the molded microfluidic nozzle array device from the mold. The microfluidic nozzle array device is formed to have nozzles that have an average outside diameter of about 60 microns and an average inside diameter of the tip (i.e., the diameter of the nozzle opening) being less than about 20 microns.

[**0095**] By polishing the conical surface of the mold that defines the nozzle, the outer surface of the nozzle is made much smoother and further the shape of the nozzles is more consistent from nozzle to nozzle and from mold run to mold run. By providing a smooth highly polished surface in the conical portion, the friction of the resin flow is reduced and this results in an increase in the accuracy and efficiency of the injection process. These techniques provide advantages when forming structures having very small dimensions, such as the nozzles of the present microfluidic device which have microscale features.

[**0096**] The microfluidic nozzle array device is then used as an electrospray device for spraying a liquid sample that is disposed within the microfluidic features formed in the microfluidic nozzle array device. As described in detail hereinbefore, the nozzle serves to spray the liquid sample into a fine mist through electric-field induced evaporation. In this example, a voltage of between 5-6 KV is applied to a conductive region formed around the nozzle tip in order to provide the necessary electric-field. The vaporized, ionized sample is then injected into an inlet of a mass spectrometer for analysis.

EXAMPLE 2

[**0097**] A polymeric microfluidic nozzle array device is fabricated using the technology disclosed herein by first providing a mold designed for an injection mold process. The mold is formed of a metal and a conical surface of the mold that defines the nozzle portion of the microfluidic device is polished with a diamond paste to form a highly polished surface. More specifically, the conical surface is polished with 1 micron diamond particles to provide a close to mirror finish for the nozzle that is formed as part of the microfluidic device. The microfluidic device is fabricated by injecting polybutyl terephthalate (PBT) into the closed mold and then curing the formed structure and then ultimately removing the molded microfluidic nozzle array device from the mold. The microfluidic nozzle array device is formed to have nozzles that have an average outside diameter of about 60 microns and an average inside diameter of the tips (i.e., the diameter of the nozzle opening) being less than about 20 microns. The mold is constructed so that a microfluidic nozzle array strip is formed having two rows of twelve nozzles each.

[**0098**] Upon removing the molded microfluidic nozzle array strip, the above process is repeated to form one or more other microfluidic nozzle array strips. The microfluidic nozzle array strips are then placed side by side and adjacent strips are detachably secured to one another by applying an adhesive (e.g., glue) to an edge of the each of the strips. More specifically, the edges are heated so that the polymeric material softens and then the adjacent strips are joined together along these edges so that a fused bond results between the two edges that are brought into contact. Preferably, the fused bond between adjacent strips includes a weakened section (e.g., a score line or the like can be formed along the bond or the thickness of the bonded interface section between the two strips can be of reduced thickness) so that one strip can easily be detached from the other strip. Any remaining microfluidic strips are attached in the same manner to form a single, tiled microfluidic nozzle array device that contains a weakened section between the adjacent bonded microfluidic devices. The number of bonded microfluidic nozzle array strips will vary depending upon the desired overall size of the microfluidic nozzle array device and more particularly, the desired overall number of reservoirs and nozzles per each microfluidic device. In use, the single, tiled microfluidic nozzle array device is broken apart into two or more sections which can be used or can further be broken apart into additional smaller microfluidic devices.

EXAMPLE 3

[**0099**] A polymeric microfluidic nozzle array device is fabricated using the technology disclosed herein by first providing a mold designed for an injection mold process. The mold is formed of a metal and a conical surface of the mold that defines the nozzle portion of the microfluidic device is polished with a diamond paste to form a highly polished surface. More specifically, the conical surface is polished with 1 micron diamond particles to provide a close to mirror finish for the nozzle that is formed as part of the microfluidic device. The microfluidic device is fabricated by injecting polybutyl terephthalate (PBT) into the closed mold and then curing the formed structure and then ultimately removing the molded microfluidic nozzle array device from the mold. The microfluidic nozzle array device is formed to have nozzles that have an average outside diameter of about 60 microns and an average inside diameter of the tips (i.e., the diameter of the nozzle opening) being less than about 20 microns. The mold is constructed so that a microfluidic nozzle array strip is formed having two rows of twelve nozzles each.

[**0100**] Upon removing the molded microfluidic nozzle array strip, the above process is repeated to form one or more other microfluidic nozzle array strips. **FIG. 17** generally illustrates the concept of tiling or otherwise combining a number of nozzle subunit structures into a microfluidic nozzle array device of greater dimension. A base plate **600** is provided and serves as the means for receiving a number of nozzle subunits structures, generally indicated at **610**, in a manner in which the nozzle subunit structures **610** are releasably interlocked with the base plate **600**. More specifically, the base plate **600** is a frame-like member having a predetermined number of retaining rails **620** that are affixed at their ends to a pair of end walls **630**. The rails **620** are spaced apart from one another so that open slots **640** are formed between adjacent rails **620**.

[**0101**] As illustrated in **FIGS. 17 and 18**, each rail **620** has a number of clamping features **650** formed as a part thereof and spaced along the length of the rail **620**. The clamping feature **650** includes side walls **652** that are spaced apart from one another to define a retaining slot **660** therebetween. The side walls **652** are disposed parallel to one another and