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**Kurulugama et al.**

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(54) **ORTHOGONAL ION INJECTION APPARATUS AND PROCESS**

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USPC ..... 250/281–300  
See application file for complete search history.

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(57) **ABSTRACT**

An orthogonal ion injection apparatus and process are described in which ions are directly injected into an ion guide orthogonal to the ion guide axis through an inlet opening located on a side of the ion guide. The end of the heated capillary is placed inside the ion guide such that the ions are directly injected into DC and RF fields inside the ion guide, which efficiently confines ions inside the ion guide. Liquid droplets created by the ionization source that are carried through the capillary into the ion guide are removed from the ion guide by a strong directional gas flow through an inlet opening on the opposite side of the ion guide. Strong DC and RF fields divert ions into the ion guide. In-guide orthogonal injection yields a noise level that is a factor of 1.5 to 2 lower than conventional inline injection known in the art. Signal intensities for low m/z ions are greater compared to conventional inline injection under the same processing conditions.

**15 Claims, 11 Drawing Sheets**

