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Multi-frequency Electrokinetic Micromixing FREDERIC BOTTAUSCI, IGOR MEZIC, University of California Santa Barbara — We report an electrokinetic process to rapidly mix micro and nanoliter volume solutions for microfluidics applications. The method consists in initiating a flow instability that will rapidly stir the microflow streams. The effect occurs by applying multi-frequency alternative current signals in a periodic array of planar microelectrodes. The device was manufactured using bulk titanium microfabrication. It consists of an array of 24 electrodes sitting on the bottom of 200 microns wide, 30 microns deep and 6 millimeters long titanium channel. The electrodes are 20 to 40 microns wide with a pitch of 40 to 80 microns depending on the configuration studied. The device is very versatile and can be used for micro-nano particles concentration, cells sorting and micromixing depending on the input signal applied. In the present study we present some measurements of the mixing behavior. We discuss the advantage of the multi-frequency electrokinetic micromixing and show some quantitative results.

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