

声表面波驱动微流体研究

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摘要:

报道了在1280旋转Y切割X传播方向的LiNbO₃基片上研制了微流体驱动器件。RF信号经功率放大器放大后馈入叉指换能器,其激发的声表面波驱动微流体。为减少由于声波辐射引起微流体温度上升,提出了间接微流体驱动方法,它通过声表面波驱动中间微粒,再由其驱动目标微流体。实验表明:声表面波驱动微流体所需的RF信号功率决定于微流体体积和粘性;采用间接方法驱动1微升50%甘油水液滴,在10V的RF信号持续5分钟下其温度变化仅0.5°C,而相同条件下直接驱动该液滴,其温度上升12.6°C。

关键词: 片上实验室; 微流体驱动; 声表面波; 超声辐射; 叉指换能器

Study on surface acoustic wave driving droplets

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Abstract:

A device for driving a droplet fabricated on 1280 Y cut X LiNbO₃ is reported. A RF signal was fed on the interdigital transducer after had been amplified and its exciting surface acoustic wave was used for driving the droplet. A method of driving a droplet indirectly is also given in the paper in order to overcome temperature arise of the droplet because of SAW radiating into the droplet, in which a microparticle is driven by SAW and then drives a droplet. Experiments show that surface acoustic wave can drive a droplet and its needed RF signal powers vary with the droplet volumes and the droplet viscosity. Experiments also show that the temperature of a 1 μ l 50% glycerine droplet is only raised 0.5°C by indirectly driving method and 12.6°C by directly driving method under 10V RF signal after 5 minutes time.

Keywords: lab on a chip; droplets driving; surface acoustic wave; ultrasonic radiation; interdigital transducer

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