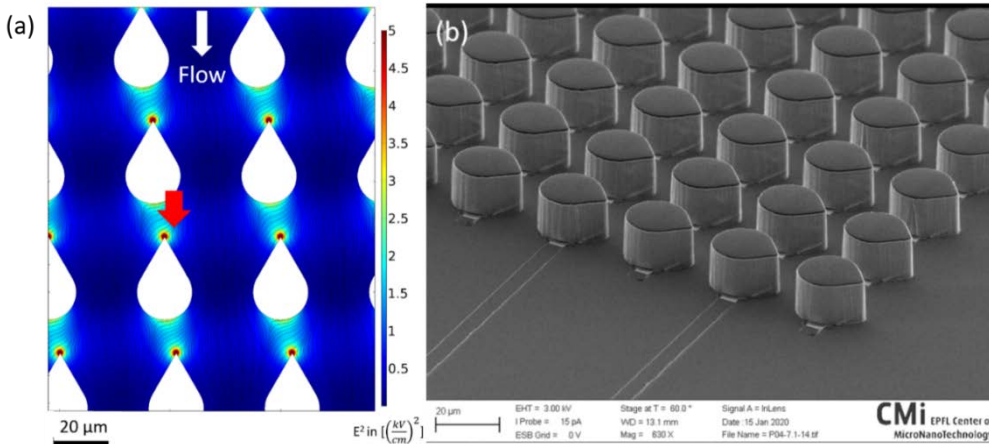


Sharp edged electrodes for DLD devices



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Sharp edged electrodes help to reduce the sorting size of DEP-DLD devices by creating high field regions where different sized particle streams split up

Description

Device, system and method for sorting particles comprised into a fluid that improve the current settings of deterministic lateral displacement (DLD)-based microfluidic devices, so to sort small particles such as extracellular vesicles, while exploiting all the advantages and throughput of well-known DLD and dielectrophoresis techniques.

The device is characterized by the presence of a plurality of three-dimensional electrodes having a longitudinal section with a narrower first end and a wider, opposed second end. This creates high electric field gradients, where particles of different sizes follow different trajectories. The high field gradient enables an effective tuning of the sorting size and enables to reach nano size (currently down to 100 nm of size) sorting of particles suspended in liquids.

The project is currently supported by the enable grant of the Technology Transfer Office. We are currently working on the proof of concept for exosome purification.

Advantages

Combining mechanical and electric sorting technology enables a

- Tunable size-based sorting

- Sorting base on dielectric properties
- Increase throughput

The sharp edged electrodes enable

- More efficient sorting compared to round shaped electrodes, allowing to operate the device less than 20 V reaching 100 nm sorting size
- Reduction in the sorting size to the 100 nm and potentially below, enabling separation for biomedical analysis (e.g. exosomes)
- Tunability over a wide size range, the maximal sorting size of the device remains the same as for round shapes (micrometers, depending on the exact layout), while the minimal sorting size is less than 100 nm

Applications

- Exosome purification
- Sample purification for medical workflows
- Filtering of nanosized biological and chemical samples
- Water purification
- Quality control in pharma, cosmetics or chemistry