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AC Electrokinetics in Microfluidic Devices

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Message from the Guest Editors

Dear Colleagues,

The use of AC electric fields for manipulating and/or characterizing liquids and small particles in suspension is well-known. Owing to miniaturization, several applications in microsystems have appeared over the last few decades in multiple research fields, such as colloidal science, microelectronics and biotechnology. For example, dielectrophoretic (DEP) forces can be used for manipulation and separation of a great variety of particles. DEP combined with electrokinetic-induced fluid flows can be leveraged for particle concentration in microfluidic devices. Additionally, application of AC fields gives rise to particle–particle interactions that lead to self-assembly patterns, a common bottom-up approach for the fabrication of engineered microstructures. A number of electric field-induced fluid flows occur in microelectrode structures; these flows can be used for standard liquid manipulation. In addition, the electrical control of the substrate wettability can be achieved by the electrowetting effect, allowing for fine tuning of contact angle and droplet manipulation within microsystems. Besides particle manipulation, AC electrokinetics has also been used to characterize the dielectric properties of particles through DEP, as well as to assist other measurement techniques by pre-concentrating the particles.

This Special Issue seeks to showcase research papers, short communications, and review articles that focus on all aspects of the application of AC electrokinetic methods in microfluidics and the lab-on-a-chip technologies.

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Special Issue