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Tracer Particles Zeta Potential Evaluation from Time Resolved μ PIV Measurements MIQUEL SUREDA, Universitat Politecnica de Catalunya, ANDREW MILLER, FRANCISCO J. DIEZ, Rutgers University — A method is proposed to directly measure the zeta potential of the tracer particles in aqueous solutions using time resolved microPIV (TR μ). The zeta potential of tracer particles in microPIV measurements used in electrokinetic flow analysis in microchannels must be known to accurately calculate the tracer particles electrophoretic velocity. By subtracting this velocity from the observed microPIV velocity, the electroosmotic velocity of the flow is obtained. Using a high-speed laser and camera, the electrophoretic velocity of the tracer particles can be directly calculated from microPIV measurements. The measurements are obtained during the first microsecond of the transient flow that is generated when a potential drop is imposed across a micro-channel. This allows fully visualizing the temporal development of the electroosmotic flow (EOF) in microchannels. For the measurements, 830 nm diameter polystyrene particles are diluted in 100 mM, 10 mM and 1 mM Borate Buffer solutions. A comparison between the proposed TR μ technique and an improved Closed Cell technique validated the results. An advantage of this proposed technique is that measurements can be performed in situ in any microchannel configuration where EOF is needed, without the need for additional calibrations providing reliable data in an easy and quick way.

Francisco J. Diez
Rutgers University

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