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Electrothermal Flow Enhanced Sample mixing in a Ratchet Microchannel. CHRISTIAN BRUMME, RYAN SHAW, YILONG ZHOU, XINYU LU, XIANGCHUN XUAN, Clemson University — We present in this talk an electrokinetic method for sample mixing in a ratchet microchannel. Due to Joule heating effects in the background electrolyte, temperature gradients are created around the ratchets causing non-uniform fluid properties. The action of electric field on these thermally induced property gradients yields an electric force that can manifest itself in the flow field in the form of circulations. We demonstrate the use of electrothermal flow circulations to enhance sample mixing through both experiment and numerical modeling.

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