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Manipulation, stability, and controlled release of micelles in AC-electric fields VICTORIA FROUDE, Y. ELAINE ZHU, University of Notre Dame — In this work, we explore the rich AC-electrokinetic effects to manipulate micelles of varied chemical structures and examine their stability in response to applied AC-electric fields. We investigate the AC-field induced transport and instability of sodium dodecyl sulfate (SDS) micelles and cetyl trimethylammonium bromide (CTAB) micelles tagged with various hydrophilic and hydrophobic fluorescent probes by using fluorescence correlation spectroscopy (FCS) at a single-molecule resolution. Micelle concentration and dielectrophoresis (DEP) mobility are examined over a broad range of AC-field frequency from 1 KHz -10 MHz and amplitude from 5V-10V. We observe a strong AC-frequency dependence of micelle concentration between two microelectrodes, from which the DEP crossover frequency switching between the positive and negative DEP response is determined. Surprisingly, we also observe the AC-field induced instability of the micelle structure and the resultant release of fluorescent probes at a characteristic low AC-field frequency of about 1-10 kHz for specific probes in SDS micelles, which could have a potential application for controlled drug release by AC-electric fields.

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