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AC electrokinetics of dense inhomogeneous biological cells suspensions under nonuniform applied fields K.L. CHAN, The Chinese University of Hong Kong, J.P. HUANG, Fudan University, K.W. YU, The Chinese University of Hong Kong — When a biological cell is placed in a nonuniform AC (or DC) electric field, force would be induced because of the interaction between the induced electric dipole moment of the particle and the external electric field. This phenomenon is called dielectrophoresis (DEP). [1] In this study a new method is proposed to handle biological cells with arbitrary permittivity and conductivity profiles, and determine the importance of multipole effect as compared with the approximate point dipole calculation [2], which is valid if the external field is homogeneous. In real situations, cells often possess arbitrary graded profiles and the study of higher multipole effects can lead to a better understanding. We also extend the calculation to dense cells suspensions by the effective medium theories [3]. The study reveals significant effects on the DEP due to higher concentration.

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