OPEN-SOURCE TOOLBOX FOR ELECTROMIGRATION SIMULATION

Santiago Márquez Damián[a,b,*]**, Federico Schaumburg**[c] **and Pablo A. Kler**[a,d,+]

[a]*Centro de Investigación de Métodos Computacionales (CIMEC, UNL–CONICET). Colectora RN 168 Km 472, S3000GLN Santa Fe, Argentina.*

[b]*Departamento de Ingeniería Mecánica, FRSF-UTN. Lavaise 610, Santa Fe, Argentina.*

[*]*santiagomarquezd@gmail.com*

[c]*Instituto de Desarrollo Tecnológico para la Industria Química (INTEC, UNL–CONICET). Colectora RN 168 Km 472, S3000GLN Santa Fe, Argentina.*

[d]*Departamento de Ingeniería en Sistemas de Información, FRSF-UTN. Lavaise 610, S3004EWB Santa Fe, Argentina.*

[+]*kler@cimec.unl.edu.ar*

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Abstract. Electrophoresis can be defined as the differential movement of charged species in solution by coulombic attraction or repulsion under the action of an electric field. Electrophoretic separations are widely used in many fields as the academy, industry or clinical laboratories due to their high separation efficiency, low reactive and energy consumption, portability and integrability with on-chip technologies, and its proven capability to integrate analytical systems with standard and non-standard detection techniques. Due to its multiphysics and multiscale characteristics, modeling and simulation of electromigration problems play a main role for the development and optimization of both analytical methods and devices. It is worth to mention that several computational tools are available since years, but all of them presents restrictions regarding the modeling (support only 1D models without flow) or the free access to the code. In this work, we present the OpenFOAM(R) toolbox *electroMicroTransport* in order to offer simulation capabilities for both electroosmotic and electrophoretic phenomena, in 3D domains, natively supporting distributed computing, with GNU-GPL version 3 license, and fully available from a public repository. We also include tutorials and application examples in order to facilitate the access and the use of the toolbox for the new users.