

# Modelling EM heating of porous media with lattice element method

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## Abstract

Electromagnetic (EM) heating of porous media has recently gained much interest in the energy and construction sectors in general, and the recovery of highly viscous bituminous or heavy oils from oil sands and shales in particular. In this study, a new model for solving the coupled heat transfer and EM equations using the lattice element method (LEM), to analyze the spatial and temporal temperature distribution of porous media reservoirs is presented. The new model provides a good basis for simulating the meso-scale behavior of EM heated porous media in view of the phenomenon of selective heating, as the different constituent phases of the porous medium can be modeled as discrete nodal elements which dissipate applied EM energy according to their loss content (polarization), which is difficult to model with continuum based models such as the finite element method (FEM).