Global Pressure Concept Applied to Two-Phase Partially Miscible Flow

(Poster)

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A new model based on the concept of the global pressure for the compositional compressible two-phase flow in porous media is presented. The flow components being considered are water and hydrogen. The new model takes into account gravity, capillary effects and diffusivity. We start from a system of nonlinear partial differential equations, consisting of mass conservation laws for each component, taking into account the basic laws - Darcy's law, Dalton's law, Raoult's law and Henry's law. The initial system is reformulated by introducing the global pressure, in order to make the system coupling less strong. In the following step, total hydrogen mass density is introduced as a new variable. The final system is fully equivalent to the starting one, but written in the terms of the global pressure and the total hydrogen mass density. This system has a well defined mathematical structure, since it consists of two nonlinear parabolic equations. This approach allows avoiding variable changes between saturated and unsaturated zones, which is not the case if the original equations were used.

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