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A constitutive theory of reacting electrolyte mixtures[1] MARTINA
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Universitaet Darmstadt, ADALBERTO BONO MAURIZIO SACCHI BASSI, University of Campinas- UNICAMP — A constitutive theory of reacting electrolyte
mixtures is formulated. The intermolecular interactions among the constituents
of the mixture are accounted for through additional freedom degrees to each constituent of the mixture. Balance equations for polar reacting continuum mixtures
are accordingly formulated and a proper set of constitutive equations is derived with
basis in the Müller-Liu formulation of the second law of thermodynamics. Moreover,
the non-equilibrium and equilibrium responses of the reacting mixture are investigated in detail by emphasizing the inner and reactive structures of the medium.
From the balance laws and constitutive relations, the effects of molecular structure
of constituents upon the fluid flow are studied. It is also demonstrated that the local
thermodynamic equilibrium state can be reached without imposing that the set of
independent constitutive variables is time independent, neither spatially homogeneous nor null. The resulting constitutive relations presented throughout this work
are of relevance to many practical applications, such as swelling of clays, developing
of bio and polymeric membranes, and use of electrorheological fluids in industrial
processes.

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