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Multicomponent Transportmodel for Normal-Pressure Plasmas: Modelling and Numerical Methods JUERGEN GEISER, Ruhr University of Bochum — We are motivated to model and simulate multicomponent transport models for cold atmospheric plasmas (CAPs). Such problems are related to the atmospheric pressure and room-temperature regimes. The plasmas are weakly ionized and have high relations of radical concentrations, e.g., oxygen, which are important for applications on surface-modifications. We derive a model based on multicomponent plasma regimes, while. each single species influences the flux-characteristics and the characteristic of the mixture, i.e., the diffusive effects of each specie are important. We assume that in the temperature- and pressure-regimes, the particles have small characteristic length instead of the length in the apparatus and we can derive and apply macroscopic equations. We extend the multicomponent systems (plasma-model) with the Stefan-Maxwell (SM) equation instead of a standard Fickian approach, while we assume to deal with non-dominant gaseous species. For solving such delicate nonlinear SM equations, we propose new iterative splitting methods based on the relaxation approaches. The novel solver methods are tested with multicomponent models in the literature.

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