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Transport and radiation in complex LTE mixtures[1] JESPER JANSSEN, Eindhoven University of Technology, KIM PEERENBOOM, Université libre de Bruxelles, JOS SUIJKER, Philips Lighting, MYKHAILO GNYBIDA, Eaton European Innovation Center, JAN VAN DIJK, Eindhoven University of Technology — Complex LTE mixtures are for example encountered in re-entry, welding, spraying and lighting. These mixtures typically contain a rich chemistry in combination with large temperature gradients. LTE conditions are also interesting because they can aid in the validation of NLTE algorithms. An example is the calculation of transport properties. In this work a mercury free high intensity discharge lamp is considered. The investigation focusses on using salts like InI or SnI as a buffer species. By using these species a dominant background gas like mercury is no longer present. As a consequence the diffusion algorithms based on Fick's law are no longer applicable and the Stefan-Maxwell equations must be solved. This system of equations is modified with conservation rules to set a coldspot pressure for saturated species and enforce the mass dosage for unsaturated species. The radiative energy transport is taken into account by raytracing. Quantum mechanical simulations have been used to calculate the potential curves and the transition dipole moments for indium with iodine and tin with iodine. The results of these calculations have been used to predict the quasistatic broadening by iodine.

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