Calculation of Detailed Multicomponent Diffusion Coefficients

Manuel Arias Zugasti,[1] Pedro Luis García-Ybarra,[1] and Jose Luis Castillo Gimeno[1]

[1] *UNED, Paseo de la Senda del Rey 9, 28040, Madrid*

The structure and stability of flame fronts depend, to a great extent, on the diffusion properties of the chemical species at the flame front. Whereas chemical kinetics effects have been extensively analyzed in recent combustion studies, the detailed diffusive transport, which is equally important regarding flame front properties, has received comparatively much less attention.

In the present work the calculation of the transport properties of a multicomponent mixture of ideal gases is revisited. New analytical relations are formally derived from the kinetic theory of gases for a mixture of an arbitrary number of components of arbitrary molecular weights and interaction potentials.

The proposed method provides a valuable tool for the calculation of transport properties of multicomponent ideal gases with a large number of chemical species, as is usually the case in combustion.