It appears in this case that the conductivities of the pure gases are not strongly affected by the presence of the foreign molecules, which indicates that clusters may be formed which contain both carbon dioxide and ethane molecules.

Lindsay-Bromley Correlation

Lindsay and Bromley (16, 17) developed a semiempirical correlation for mixtures at normal pressures based on the Wassiljewa equation (30).

$$k = \frac{k_1}{1 + A_{12}\frac{x_2}{x_1}} + \frac{k_2}{1 + A_{21}\frac{x_1}{x_2}} \qquad (10)$$

Sutherland (27) has shown, using simple kinetic theory, that the coefficients A_{12} and A_{21} could be calculated from the equation

$$A_{12} = \frac{1}{4}\left[1 + \left[\frac{\mu_1}{\mu_2}\left(\frac{M_1}{M_2}\right)^2 \frac{\left(1 + \frac{S_1}{T}\right)}{\left(1 + \frac{S_2}{T}\right)}\right]^{1/2}\right]^a \left(\frac{M_1 + M_2}{2M_2}\right)^b \frac{\left(1 + \frac{S_{12}}{T}\right)}{\left(1 + \frac{S_1}{T}\right)}, \qquad (11)$$

where the S_1, S_2 and S_{12} are the Sutherland constants. Kinetic theory indicated that a = 1/2 and b = 1/2. However, he demonstrated that to make the relation fit experimental data, b must equal -1/4.