The conductance of a solution is proportional to the concentration of the ions in the concentration. Applying this to the reacting system yields the following equations:

$$L_0 = \gamma C_{Ea0} + \beta C_{OH0} + \delta C_{H_20} \tag{A.1}$$

$$L_t = \gamma C_{Ea} + \beta C_{OH} + \delta C_{H_20} \tag{A.2}$$

$$L_\infty = \gamma C_{Ea\infty} + \beta C_{OH\infty} + \delta C_{H_20} \tag{A.3}$$

From these relationships it follows that:

$$\frac{L_0 - L_t}{L_t - L_\infty} = \frac{\gamma C_{Ea0} + \beta C_{OH0} + \delta C_{H_20} - (\gamma C_{Ea} + \beta C_{OH} + \delta C_{H_20})}{\gamma C_{Ea} + \beta C_{OH} + \delta C_{H_20} - (\gamma C_{Ea\infty} + \beta C_{OH\infty} + \delta C_{H_20})} \tag{A.4}$$

The conductivity of the water is assumed constant and this simplifies to:

$$\frac{L_0 - L_t}{L_t - L_\infty} = \frac{\gamma(C_{Ea0} - C_{Ea}) + \beta(C_{OH0} - C_{OH})}{\gamma(C_{Ea} - C_{Ea\infty}) + \beta(C_{OH} - C_{OH\infty})} \tag{A.5}$$

The reaction is one to one. From this the equations A.6 and A.7 are derived.

$$C_{OH} = C_{OH0} - (C_{Ea0} - C_{Ea}) \tag{A.6}$$

$$C_{OH} = C_{OH\infty} - (C_{Ea\infty} - C_{Ea}) \tag{A.7}$$

Substituting equations A.6 and A.7 into Equation A.5 results in Equation A.8.

$$\frac{L_0 - L_t}{L_t - L_\infty} = \frac{\gamma(C_{Ea0} - C_{Ea}) + \beta(C_{OH0} - (C_{OH0} - (C_{Ea0} - C_{Ea})))}{\gamma(C_{Ea} - C_{Ea\infty}) + \beta(C_{OH\infty} - (C_{Ea\infty} - C_{Ea}) - C_{OH\infty})} \tag{A.8}$$

Cancellation of terms, factoring, and further cancellation of the right hand side of Equation A.8 results in Equation A.9

$$\frac{L_0 - L_t}{L_t - L_\infty} = \frac{C_{Ea0} - C_{Ea}}{C_{Ea} - C_{Ea\infty}} \tag{A.9}$$