CHAPTER V

RESULTS AND DISCUSSION

5.1 Results

The results of the numerical calculations are shown in Fig 4.4.1 a-f and Table 4.4.1 in chapter IV. We can summarize the results in Fig.4.4.1 a-f into the same graph as shown in Fig.5.1.1. The figures show the relation between the reciprocal trap depth ($1/\Delta$) and the energies of the exciton in the mixed naphthalene crystals for the monomer states at the concentration c = 0.0, 0.2, 0.4, 0.6, 0.8 and 1.0. The graphs intersect the horizontal axis at the same point ($E = 8.00\text{-}9.00\ cm^{-1}$). The figure can also be used to determine the resonant energies of the monomer states. This can be done by picking a reciprocal trap depth along the vertical axis ($G_o(E) = 1/(1-2c)\Delta$) and read off the resonant energy along the horizontal axis.

We can also evaluate these relations at any other concentrations by using the relation $G_o(E) = 1/(1-2c)\,\Delta$ (except at c = 0.5, since $G_o(E)$ goes to infinity).

Our results agree with Hong and Kopelman when c = 0.0 which gives $G_o(E) = 1/\Delta$ (see Fig.5.1.1 at c = 0.0). The difference between our results and Hong and Kopelman's results is our depend on the concentration of impurity.

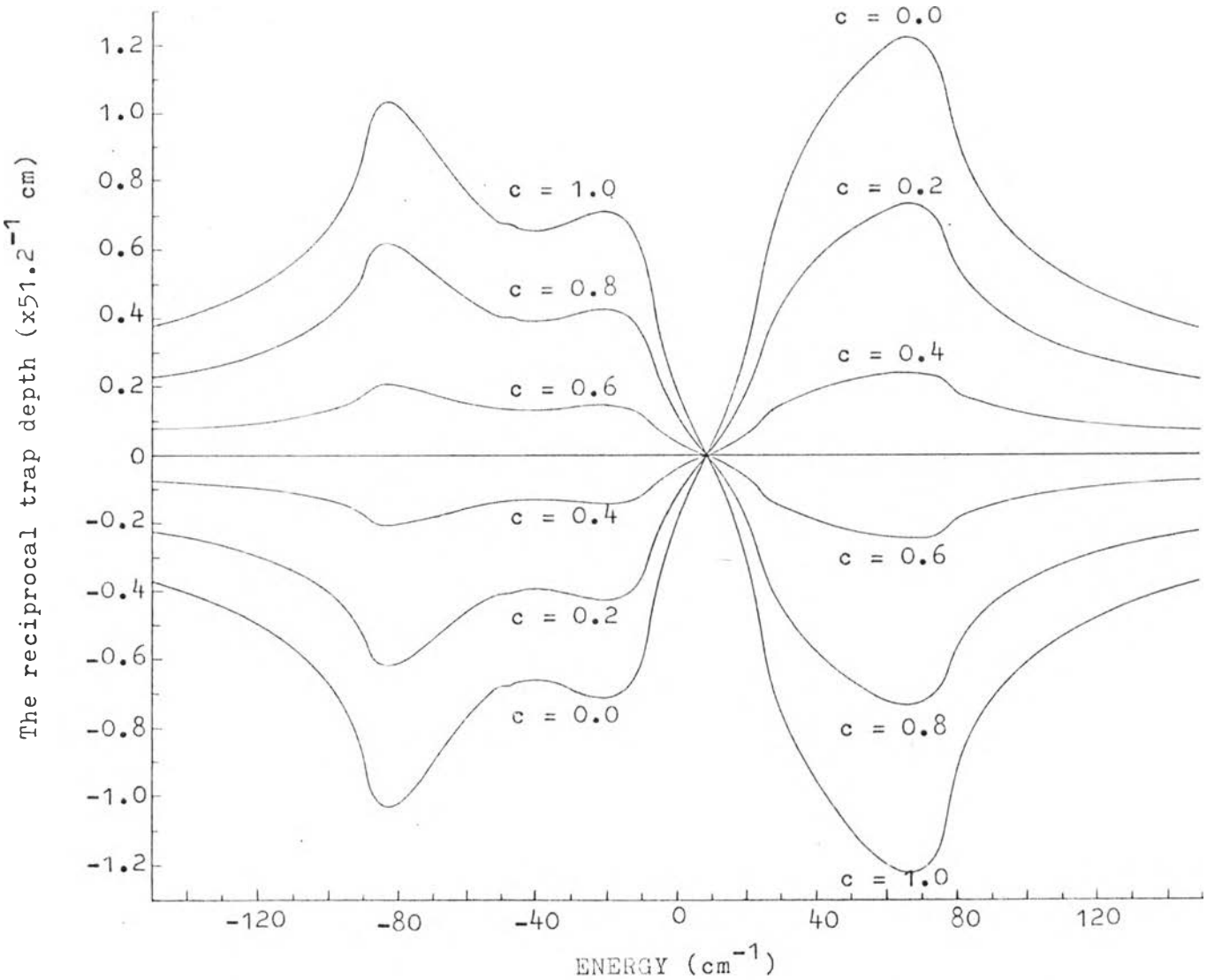

Fig.5.1.1 The monomer energies and the reciprocal trap depth in the same graph

5.2 Discussion

In this research, we consider only monomer and one - complex graphs in calculation $P_n(c)$. So it is self consistent in our monomer problem. In Chatuporn's research,[15,16] she calculated the monomer self energy by using the Stirling numbersof the second kind representation of $P_n(c)$ polynomials which correspond to all possible graphs, so it is not self consistent.

Our result is similar to that of Leath and Goodman's work[11] which was symmetric in two constituents and depending on concentration of impurity (see Fig.5.1.1).

I believed that if we consider in the dimer problem using a suitable $P_n(c)$ to replace the approximation of Hong and Kopelman[7] or representation of $P_n(c)$ by using the Stirling numbersof the second kind in Suporn's research[19], we should obtain the result having the property similar to our in the monomer case. For instance, it may be dependent on the concentration of impurity.