This dissertation deals with the investigations carried out by the author during 1983-87 on the topic entitled "DIATOMIC MOLECULAR PARAMETERS AND BOND ORDERS USING ELECTRONEGATIVITIES". The dissertation has been written in three Chapters.

Chapter I is divided into two parts 1.1 and 1.2. Part 1.1 gives a brief account of the theory on the concept of electronegativity. In this the electronegativities evaluated by different methods are given. In Part 1.2 the relation between potential energy and intermolecular distance for diatomic molecules is given. It is shown that the potential energy function proposed by SzoKE incorporating equalized electronegativities gives better values compared to other functions.

Chapter II deals with the use of electronegativities in the calculation of diatomic molecular parameters. In this Chapter the molecules $^1\text{H}_2\text{N}$, $^2\text{H}_2\text{N}$, $^1\text{H}_3\text{N}$, $^2\text{H}_3\text{N}$, $^2\text{H}_3\text{N}$, and $^3\text{H}_3\text{N}$ have been studied and the proportionality constant 'd' and Lennard-Jones Parameters 'ab' and 'd' are determined for the potential energy function used by SzoKE. Electronegativities have also been used in evaluating the anharmonicity $\omega X_e^1$ and the rotational-vibrational coupling constant $d_e$ for these molecules.
Chapter III deals with the use of electronegativities for the estimation of Bond Orders. In this Chapter the molecules LiF, LiCl, LiBr, LiI, NaF, NaCl, NaBr, NaI, KF, KC1, KBr, KI, RbF, RbCl, RbBr, RbI, CsF, CsCl, CsBr and CsI have been studied. The Bond Orders have been estimated using the proposed formula 
\[ q = 0.5r_e \left( D_e^{1/2} \right)^{1/2} \]. It is also shown that \( q/(0.5r_e)^2 \) is the correct definition of Bond Order instead of 'q' itself. The estimated bond orders for the Alkali Halides mentioned above have been compared with the literature values and are found to be in reasonably good agreement with them. Two papers comprising some of the results have been communicated to the Journal "ACTA CHIMICA HUNGARICA".