

Contents

List of symbols and abbreviations	9
1. Introduction. The aim and scope of the studies	11
2. X-ray scattering in liquids and binary solutions	13
2.1. Diffraction of X-rays by free molecules	13
2.2. General formulas for the diffraction by liquid and liquid solutions	16
2.3. A relation between X-ray diffraction and packing coefficient of molecules	19
2.4. Coordination numbers in liquid systems.....	21
3. Experimental study of the diffraction by liquids and liquid solutions	23
3.1. An X-ray transmission diffractometer with a temperature camera for the study of liquid solutions	23
3.2. Conditions of X-ray scattered intensity measurements	26
3.3. Correcting the experimental data	27
3.4. Method for normalizing experimental X-ray intensities	27
4. Interpretation of the structure of non-dipolar solvent	29
4.1. X-ray scattering in liquid <i>p</i> -Xylene	29
4.2. Relations between mean amplitudes of vibration and corresponding internuclear distances	31
4.3. Structural results from X-ray diffraction	35
5. X-ray diffraction investigation of molecular ordering in dipole liquids	39
5.1. Determination of the molecular structure of <i>ortho</i> -, <i>meta</i> - and <i>para</i> -chloroanisole	39
5.2. Models of short-range order in liquid <i>ortho</i> -, <i>meta</i> - and <i>para</i> -chloroanisole from X-ray diffraction studies	45
5.3. Final remarks. The use of X-ray analysis in the studies of structure of dipolar liquids ..	48
6. X-ray analysis of intermolecular interactions in binary liquid solutions	51
6.1. The experimental results and interpretation	51

6.2. Approximates models arrangement of molecules in binary liquid solutions	54
6.3. Final remarks. The application of X-ray diffraction in the investigations of solutions of certain dipolar liquids with non-dipolar solvent	57
7. Conclusions	59
Literature	61