

### **i) Crystal Growth:**

Slow evaporation, Gel, Melt growth, Bridgmann methods, CZ Growth: Examples of grown crystals include simple to complex, i.e., simple ionic systems KCl, KBr - pure and doped with dilute divalent impurities  $\text{CdCl}_2$ , II-VI semiconductor CdTe, two dimensional system  $1\text{T-TaS}_2$ , CMR material LCMO, etc.

### **ii) Equipments:**

Cameras Laue, Oscillation, Powder, Precession cameras, Manual 4-circle X-ray diffractometer, Rigaku 4-circle automatic single crystal diffractometer, AFC7R automatic single crystal diffractometer, AFC5R automatic single crystal diffractometer, CAD-4 automatic single crystal diffractometer, Rigaku powder X-ray diffractometer (with a superconducting magnet (5 Tesla) and a cryostat with temp. down to 4K.), Microdensitometer, Crystal pulling instruments, Other crystallographic, material science related instruments.

### **iii) Computer:**

Working Knowledge in IBM - PC, Apple Macintosh - PC, Cyber180/830A - Mainframe, SX-4 Supercomputing system - Mainframe

Operating Systems Windows – Microsoft, Apple, Unix

Softwares System softwares, variety of utility programs, Graphics tools

Application software – Shelxl, Wingx - Crystal structure Analysis involving light atoms, PREMOS - Modulated Structures – using super-space group, MEM – Suite programs for the electron density analysis, PDFFIT, PDFGetX – Pair Distribution Function Analysis software suite, Fullprof, JANA 2000 – Structural analysis programs using powder data and multipole technique, Many self written programs for structural analysis.

He can develop/modify computer programs. In fact, almost all the programs needed for his research work were developed by himself. He has a good working knowledge in softwares related to crystallographic computation, graphics etc. He has got experience in working with the mainframe computer, CYBER 180/830A as well as in the supercomputing system SX-4 (NEC vector computer). He can create/modify FORTRAN programs not only in the UNIX system as well as in the supercomputing systems, but also in the MAC-OS or Windows for PC's. In fact he has made extensive modifications in PREMOS (Powder refinement of modulated structures) and stabilized this program in the Dept. of Applied Physics, Faculty of engineering, Tohoku University, Sendai, Japan. He can create precise electron density maps using the versatile MEM (Maximum Entropy Method) technique. Using a super computer SX-4, he has computed and plotted the total electron density distributions of some semiconductor materials.