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Title of the thesis : ***Experimental Studies of ZnSe, ZnTe chalcogenide
and LPCCM, LAM, KDP, GP non-linear optical
compounds***

ABSTRACT

From last few decades the use of single crystal and nanoparticles/nanocrystals has been increased extensively. The large-scale use of crystals in various technologies has made the study of growth of single crystals of different technological materials an interesting and essential field of research. Single crystal technology is now treated to be the mother of almost all the recent technologies of the modern science, which continuously changing the life style of mankind. A single crystal or monocrystalline solid is a material in which the crystal lattice of the entire sample is continuous and unbroken to the edges of the sample, with no grain boundaries. The absence of the defects associated with grain boundaries in the single crystal can give the unique properties, particularly crystalline perfection, optical, dielectric, mechanical and electrical. These properties of single crystals make them precious in industrial as well as technological applications, especially in optoelectronic as well as electro-optics.

Due to the potential applications of semiconductors as well as nonlinear optical materials like: Zinc Selenide (ZnSe), Zinc Telluride (ZnTe), L-proline cadmium chloride monohydrate (LPCCM), L-asparagine monohydrate (LAM), potassium dihydrogen phosphate (KDP), Glycine picrate (GP) single crystals and nanoparticles/nanocrystals, these materials are very useful in optoelectronics and nonlinear optical device fabrications of large as well as nano size.

MAJOR FINDINGS:

- **The single crystal of ZnSe of size ~ 25 mm length & ~ 10 mm diameter was grown successfully by VBT using the fabricated two zone tubular furnace.**
- **The single crystal of ZnTe of size ~ 50 mm length and ~ 19 mm diameter was grown successfully by VBT using the fabricated two zone tubular furnace.**

- The synthesis of ZnSe nanoparticles was done for the first time by microwave irradiation technique.
- The synthesis of ZnTe nanocrystals was done for the first time by microwave irradiation technique.
- Bulk single crystals of LPCCM of size ~45 mm lengths & ~ 20 mm diameter were grown successfully first time by SR method
- Bulk single crystals of LAM of size ~52 mm length and ~ 18 mm diameter were grown successfully first time by SR method.
- Good quality single crystals of L-threonine doped KDP were grown by slow evaporation solution technique for the first time.
- Good quality single crystals of Glycine Picrate (GP) were successfully grown for the first time by slow cooling method.

AS THE OUTCOME FROM THE ABOVE WORK THE PAPERS WERE PUBLISHED IN HIGH IMPACT

FACTOR JOURNALS AS THE DETAILS ARE GIVEN BELOW:

PUBLICATIONS

Sr. No.	Name of the journal	Year of Publication/Acceptance	Impact Factor (5years average)	Current Impact Factor
1	Mohd. Shakir, Solid State Communication	2009	1.838	1.979
2	Mohd. Shakir, Journal of Crystal Growth	2009	1.850	1.737
3	Mohd. Shakir, Applied Physics Letters	2009	3.845	3.820
4	Mohd. Shakir, Chalcogenide Letters	2009	0.835	0.835
5	Mohd. Shakir, Material Chemistry and Physics	2010	2.462	2.353
6	Mohd. Shakir, J. of Applied Crystallography	2010	4.871	3.794
7	Mohd. Shakir, Mat. Sci. & Eng. B	2010	2.614	1.560
8	Mohd. Shakir, J. of Applied Crystallography	2010	4.871	3.794
9	Mohd. Shakir, Materials Research Bulletin	2010	2.098	2.145
10	Mohd. Shakir, Journal of Applied Physics	2010	2.201	2.064
11	Mohd. Shakir, Journal of Crystal Growth	2010	1.850	1.737
12	Mohd. Shakir, Physica B: Condensed Matter	2011	0.932	0.932
13	Mohd. Shakir, Int. J. of Pure & Appl. Physics	2011
14	Mohd. Shakir, Spectrochim. Acta Part A: Mole. and Biomolecular Spectroscopy	2011	1.723	1.770
15	Mohd. Shakir, J. of Applied Crystallography	2011	4.871	3.794
16	Mohd. Shakir, Material Chemistry and Physics	2011	2.462	2.353
17	Mohd. Shakir, Int. journal of Physics & Applications	2011	-----	-----
18	Mohd. Shakir, Int. J. of Applied Physics	2011	-----	-----
19	Mohd. Shakir, Physica B: Condensed Matter	2011	0.932	0.932
20	Mohd. Shakir, Chalcogenide Letters	2011	0.835	0.835
21	Mohd. Shakir, Physica B: Condensed Matter	2011 (accepted)	0.932	0.932

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