GROWTH AND CHARACTERIZATION OF PURE THIOUREA CRYSTAL

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ABSTRACT

Poly crystals of pure thiourea an organic material: have been grown by slow evaporation technique at room temperature .The crystalline nature of grown crystal was confirmed by functional group of the grown crystals was found by FTIR analysis. The spectral bands have been compared with similar thiourea complexes using FTIR spectrum in the range 1000- 3500 cm^{-1} The UV- Vis study was performed to know optical behaviour of the grown crystals.

I.INTRODUCTION

Today crystals are the pillars of modern technology. Progress in crystal and epitaxial technology is highly demanded in view of its essential role for the development of several important areas such as production of high efficiency photovoltaic cells and detectors for alternative energy and medicine, and the fabrication of bright long-lifetime light emitting diodes, for saving energy by wide use in illumination and traffic lights, Without crystals there would be no electronics industry, photonic industry fibre-optic communication etc. Very little modern optical equipment and some very important gap are in conventional production engineering. Integrated microelectronics and optoelectronics necessitated improved growth technology for large diameter silicon, GaAs and INP in combination with optimized defect and property control on submicron scale. High temperature high power electronics demands mastering of growth and processing problems of difficult materials like Sic and Gan. The success of laser fusion energy depends on the timely development of high-power laser crystals and radiation resistant frequency multiplying crystals of oxide compounds. Furthermore the great and wide potential of oxide superconductors with high transition temperature could not be explored so far because proper crystal growth and material technology development was neglected.

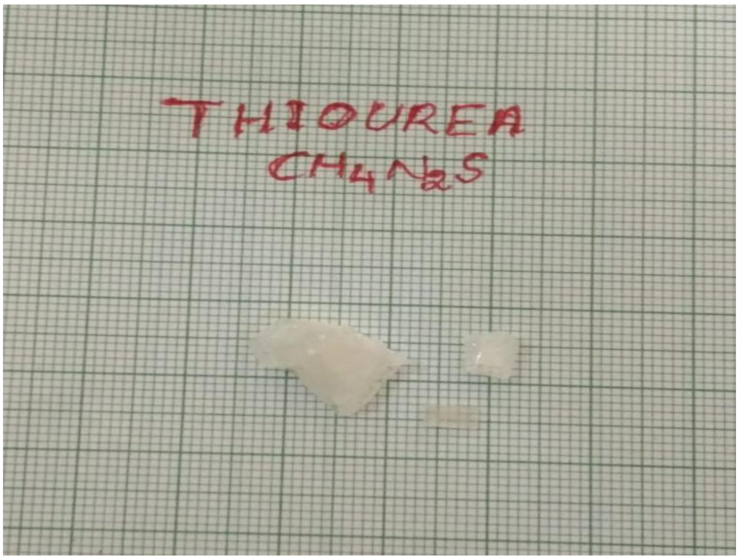
II. METHODS

(1) Slow Evaporation Method:

In this method, an excess of a given solute is established by utilizing the difference between the rates of evaporation of the system remains constant in the solvent evaporation method. The solution loses particles, which are weakly bound to other components and therefore the volume of the solution decreases. In almost all cases, the vapour pressure of the solute and therefore the solvent evaporates more rapidly and the solution becomes supersaturated usually it is sufficient to allow the vapour format above the solution to escapes freely into the atmosphere. This is the oldest method of crystal growth and technologically. It is very simple typical growth conditions involve temperature stabilization to about 0.005^0C and rates of evaporation of a few mm^3/hr.

GROWTH OF PURE THIOUREA CRYSTAL:

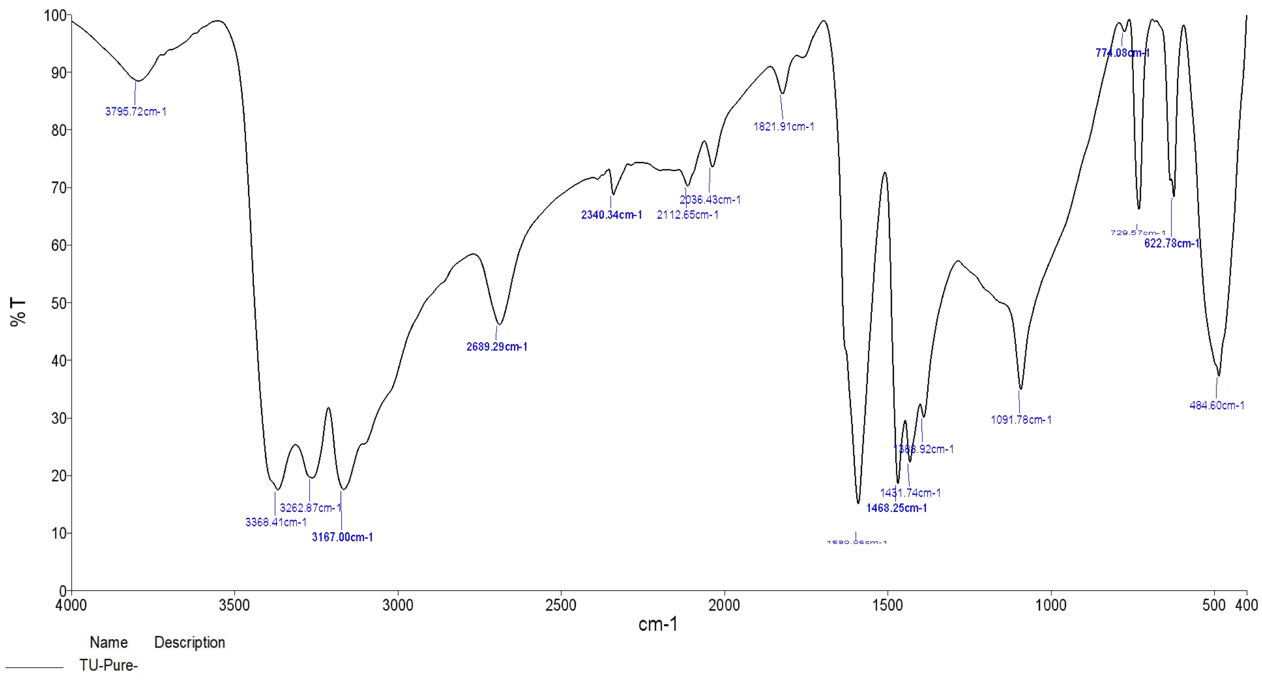
The 10ml double distilled water is taken in the 50ml beaker. The addition of 0.8909g of Thiourea with constant stirring by stirrer. After one hour stirrer by the solution get saturated. Then solution is filtered by filter paper. Here the work is done in room temperature itself. This saturated solution is taken in a 50ml beaker and the beaker is closed with the Aluminium foil sheet. Some tiny holes are made on the foil sheet. So the creation of a few small seed crystals at bottom of beaker containing the mother solution within 15 days. The grown crystal of pure Thiourea is showed in the below figure.



The grown crystal pure Thiourea crystal

The FTIR spectra of as prepared pure Thiourea crystal sample:

The graph is plotted between % of transmittance and wave number (cm^{-1}).In this graph different peaks formed at different wave number. It is observed that the graph have various frequency vibrations which are shown by different peaks formed.



The graph is plotted between % transmittance and wave number (cm-1).In this graph different peaks formed at different intensity (a.u). It is observed in the graph that pureThiourea have various frequency vibrations which are shown by different peaks . and the

Frequency(cm^{-1})	Nature of the peak	Assignment
3262.87	Strong	N-H Amine Stretch
2689.29	strong	O=HCarboxylic acid
2036.43	Medium	Nitrite medium
1821.91	Weak	-C-H(Aromatic)
1091.78	Strong	C-I stretchAlkyl Halid

The UV spectra of as pure Thiourea crystal sample:

The optical transmission studies were recorded for the sample obtained for the crystal. The sample is prepared by dissolving in the water. To find the transmission range of pure Thiourea crystal the optical transmission spectrum was recorded using UV –Vis Nir spectrometer.

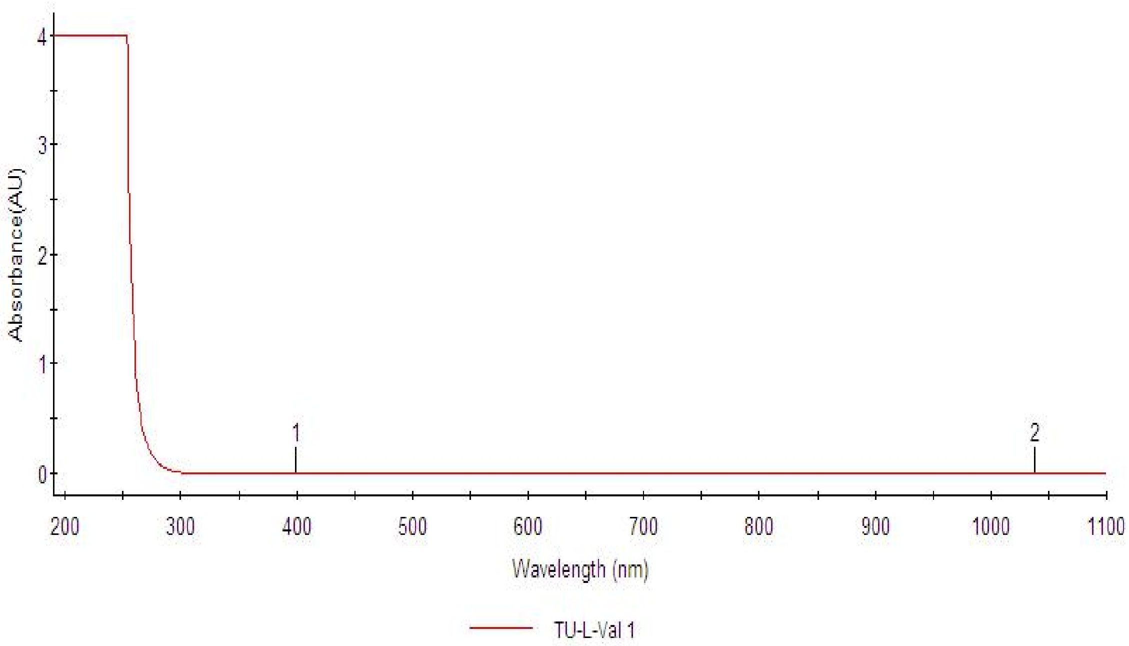


Figure: UV –Visible spectrum of pure Thiourea crystal.

S.No	Peak (nm)	valley(nm)
1	*398.8*	*0.001233348*
2	*1,038.0*	*0.002547054*

Conclusion:

Thiourea has been growing by slow evaporation method:

The growth of pure Thiourea crystal was grown by solution method under slow evaporation technique. The spectacular growth of solid state electronics is critically dependent on crystal quality. The most versatile technique of commercial importance is solution technique.

The FTIR studies of samples the characteristics absorption of the bands.

UV-Vis Spectroscopy is a quantitative technique used to measure how much a chemical substance absorbs light.

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