

# IS AMMONIUM CHLORIDE A SUBLIMABLE SUBSTANCE ?

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**Abstract:** Majority of Science Textbooks at National and International level for classes 6th to 10th mentions the example of Ammonium Chloride as a Sublimable material and also prescribe it as a material to show the activity of Sublimation in the classroom . In fact it is not a sublimable substance and does not undergo reversible physical change rather reversible chemical change is involved in it ,therefore the example of Ammonium Chloride cannot be taken for showing the phenomenon of Sublimation.

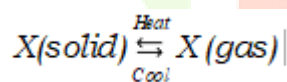
**Index Terms** - Interconversion of States of Matter, Sublimation

## I. INTRODUCTION

Separation of substances has been the topic in material theme at upper primary and secondary stages in India (1) and also an important part in the rest of world. Several worksheets are also available on line on this concept (2,3)

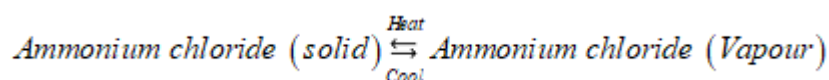
Theory and experiment related with sublimation is performed to understand the phenomenon of changing of solid to gas and vice-versa as sublimation. The common example of subliming materials given in the textbooks are camphor, naphthalene, iodine, dry ice and ammonium chloride.

Basically, sublimation is a physical change in which, on heating solid state of substance directly changes into gaseous state, and on cooling reverse reactions takes place.



This process is demonstrated in a closed system. Usually, solid substance is taken in a china dish and an inverted glass funnel having plugged cotton at the mouth of its stem, is placed over the substance. The substance in the china dish is heated over the tripod stand with the help of any source of heat like spirit lamp/ gas burner. The substance on heating directly changes into vapor phase without transforming into liquid state i.e melting. The vapors of the substance is cooled and gets deposited on the inner walls of the inverted funnel.

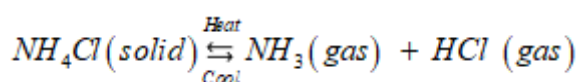
Now let us consider the example of ammonium chloride for sublimation, we should have



It is well known that ammonium chloride on heating above 340°C decomposes into ammonia and hydrogen chloride gas.



It is also known that it is a reversible reaction in the closed system in which, on cooling ammonia gas and hydrogen chloride gas combines back to form ammonium chloride and deposited as solid.



Here, in both the processes, thermal decomposition of ammonium chloride into ammonia gas and hydrogen chloride gas and also the combination of the two gases to form solid ammonium chloride are the examples of chemical changes.

Since sublimation is a purely physical change in which a solid state of a substance on heating below its melting point changes into gaseous (vapour) state on cooling, converted back into solid state. Hence the example of ammonium chloride does not fit into the concept of sublimation.

## REFERENCES

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