

# **BOAT' CYCLOHEXANE AND ITS STRUCTURAL CONSEQUENCES**

by

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submitted

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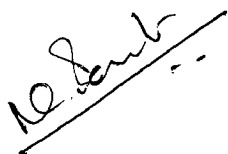
*Dedicated to my nephews*

*Aashu and Shruti*

## Certificate

This is to certify that the thesis entitled “‘Boat’ Cyclohexane and Its Structural Consequences” being submitted by **Mukesh** to the Indian Institute of Technology, Delhi for the award of **Doctor of Philosophy** is a record of bonafide research work carried out by him. Mukesh has worked under my guidance and supervision and has fulfilled the requirements for the submission of thesis which to my knowledge has reached the requisite standards.

The results contained in this thesis have not been submitted in part or full to any other university or institute for the award of any degree / diploma.



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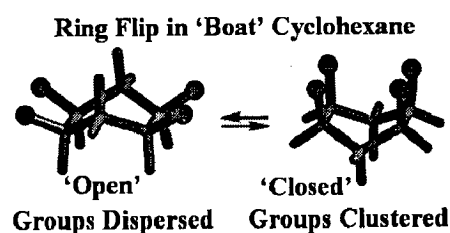


Mukesh

## Abstract

This thesis investigates in field of chemistry, long thought to be well resolved, with little left to discover, namely, the conformation of cyclohexane, the preeminent cycloalkane! The work carried out deals with the rational design, synthesis and characterisation of a 'boat' cyclohexane lacking the conventional 1, 4 restraint. Stabilisation of the 'boat' conformation has been achieved by 1,2-*cis* fusion of an appropriate five membered ring to skeleton. The acenaphthene skeleton has been found to be ideal for this purpose.

The principal question being addressed is deceptively simple, *if cyclohexane can be made to adopt a stable unrestrained 'boat' conformation, will it 'ring flip'?*



Unfortunately however, though a final resolution to this question is awaited, this thesis offers some new and unanticipated insights into the conformational behavior of cyclohexane ring system. These findings have been exploited by designing and synthesising a 'Clamshell' receptor for  $\text{Ag}^+$  ions. Among its novel features are the simple synthetic access and the modular design strategy.

We believe that our findings are broadly applicable in a wide range of settings. We also feel that this thesis demonstrates molecular modeling tools now commonly accessible to the synthetic chemist community, can be used productively to discover hitherto unrecognised behaviors and to aid the design of ever more interesting molecular targets with novel attributes.

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