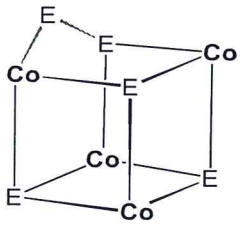
## Department of Chemistry, IIT Madras
## Research Proposal Seminar

**Name: Kriti Pathak (CY16D002)** **Venue: CB310**

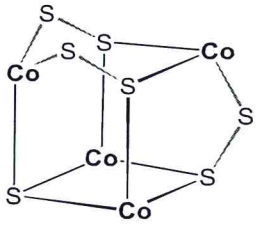
**Date: ~~06.11.2019~~ 08.11.2019** **Time: ~~4~~ 3.00 P.M.**

# Chemistry and applications of homocubane clusters

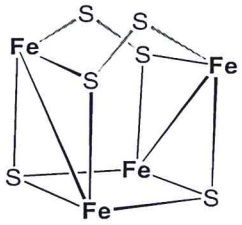
Homocubanes[1] are noncyclopropanoid homologues of cubane[2] ($C_8H_8$) derived by the introduction of one, two, three etc. methylene groups into the cubane skeleton. Cubane and its derivatives were the first saturated polycyclic caged hydrocarbons to gather interest due to their potential applications in the production of high energy fuels.[2b] Despite the ease of storage, handling and proficiency under standard conditions, the synthesis of cubane is challenging as it involves multiple steps.[2c] The rich chemistry of these molecules, by virtue of their inherent strain energy, has been widely exploited in the recent past.[1a] Despite notable growth in this field, the quest for homocubane-type species met with little success. Although there are reports of homocubane-type molecules combining transition metals and chalcogen elements[3] (**I-IV**, Chart 1), examples of such molecules involving boron in the cubane core, are rather limited. In this seminar, the synthetic routes for the preparation of higher order homocubanes and their analogues, their applications as well as the preliminary results of my research work in this field will be discussed.



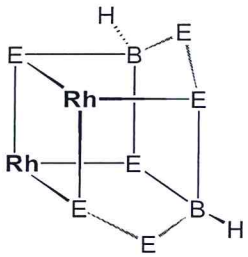

**Co** = CpCo
**I:** E = S, **II:** E = Se




**III: Co** = CpCo




**IV: Fe** = CpFe




**Rh** = Cp*Rh
**V**: E = S, **VI**: E = Se

**Chart 1.** Different types of homocubane analogues; **I-VI**.

***References:***


[1]. (a) A. P. Marchand, *Chem. Rev.* 1989, **89**, 1011–1033; (b) L. A. Paquette, J. C. Stowell, *J. Am. Chem. Soc.* 1970, **92**, 2584–2586.

[2]. (a) P. E. Eaton, T. W. Cole, *J. Am. Chem. Soc.* 1964, **86**, 962–964; (b) P. E. Eaton, *Angew. Chem. Int. Ed. Engl.* 1992, **31**, 1421–1436; (c) G. W. Griffin, A. P. Marchand, *Chem. Rev.* 1989, **89**, 997–1010

[3]. R. D. Adams, S. Miao, *Inorg. Chim. Acta* 2005, **358**, 1401–1406; (b) H. Ogino, S. Inomata, H. Tobita, *Chem. Rev.* 1998, **98**, 2093–2121.


Signature of Guide

1 NOV 2019.

Signature of Coordinator

Signature of H.O.D

HEAD OF THE DEPARTMENT
DEPT. OF CHEMISTRY
INDIAN INSTITUTE OF TECHNOLOGY, MADRAS