

RING OPENING ALKYNE METATHESIS POLYMERIZATION (ROAMP)

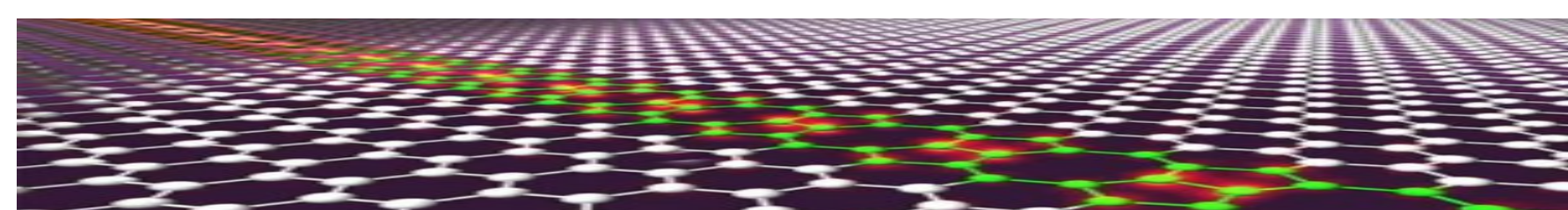
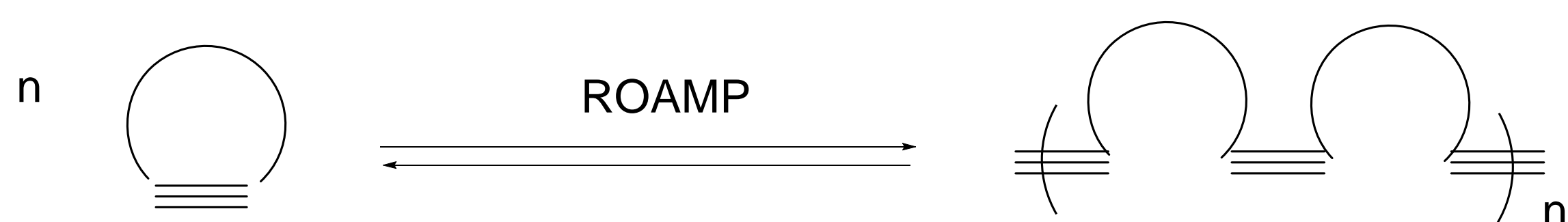
2016 Context-Based Research Experiences for Community College Teachers (RET) Program

Abstract

Various polymeric organic compounds are explored for their usefulness for applications for electrical and electronic components, among others. The present synthetic pathways for selected intermediates of some organic compounds explore whether Molybdenum complex with a trianionic pincer ligand could be synthesized. Synthetic products with Ring-Opening Alkyne Metathesis Polymerization (ROAMP) reactions are investigated. Specific contribution made for the Summer 2016 included synthesis of intermediates for high-oxidation state of molybdenum complexes with OCO trianionic pincer ligand, which have been shown to have increased nucleophilicity at the carbyne ligand. Using the intermediate compounds ROAMP reactivity with Mo precursors and its metalation may be further investigated.

Introduction

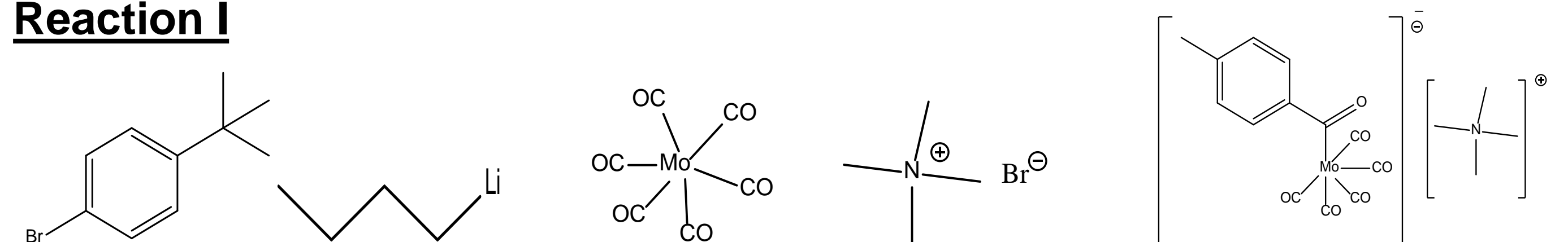
Ring-Opening Alkyne Metathesis Polymerization (ROAMP) reactions involve making polymers from monomers. Catalysts are usually used to make polymers.



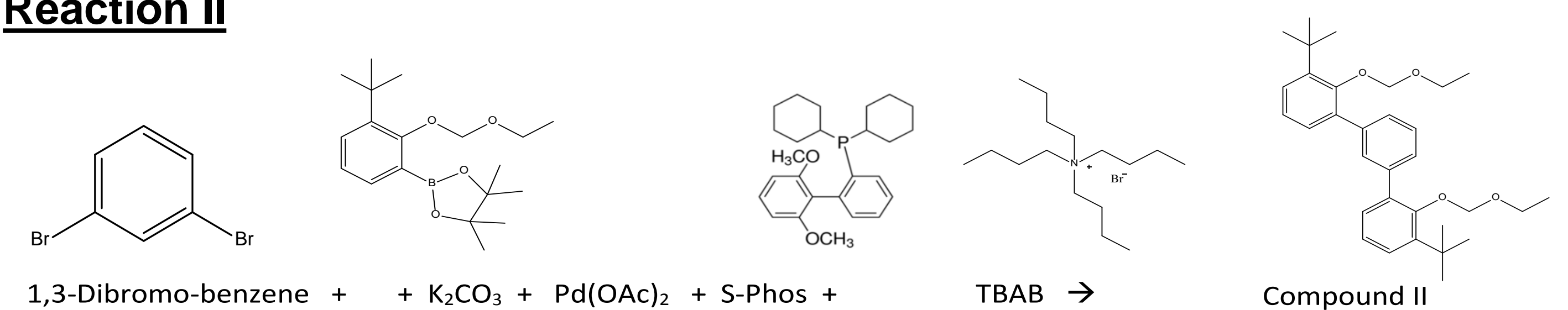
Reference: Ryan Whitman: Graphene nanoribbons could be the savior of Moore's Law, Feb. 17, 2014

Method

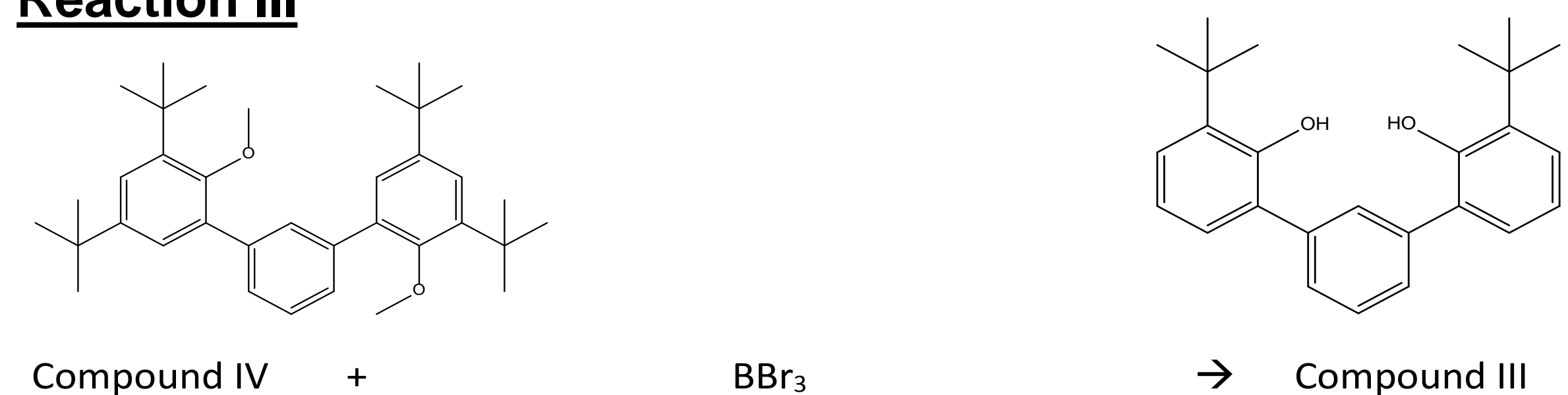
Reaction I



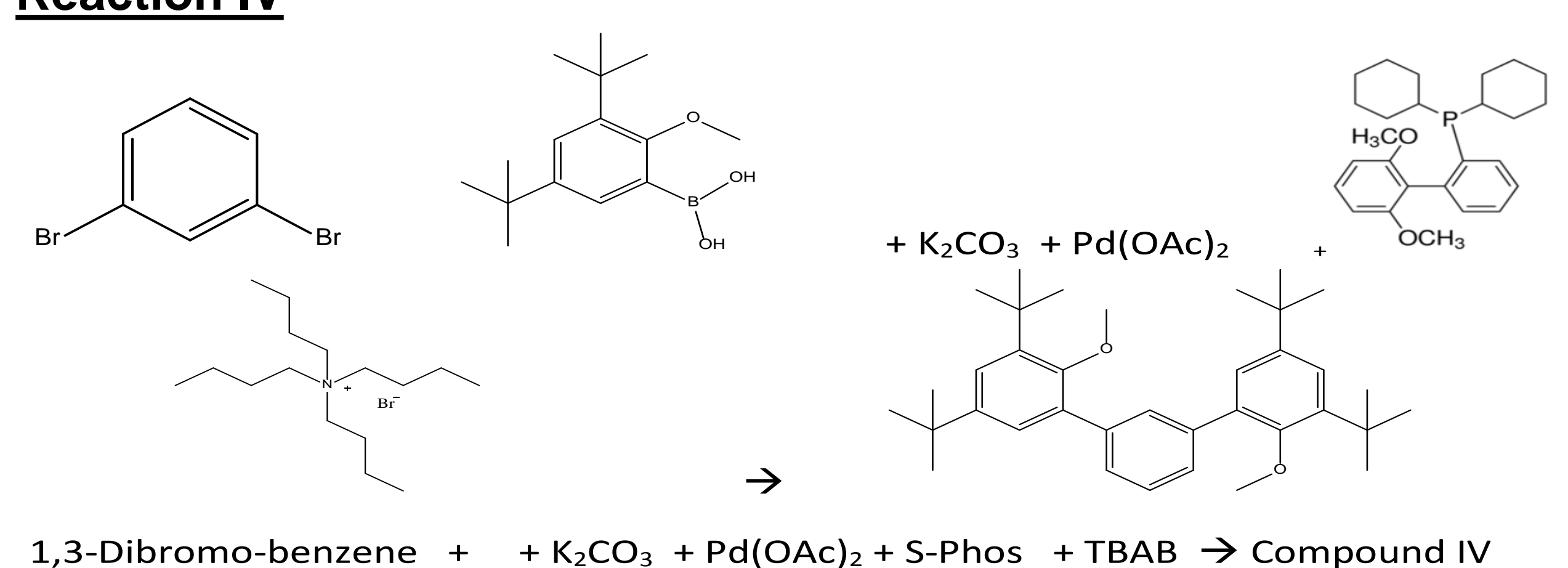
Reaction II



Reaction III



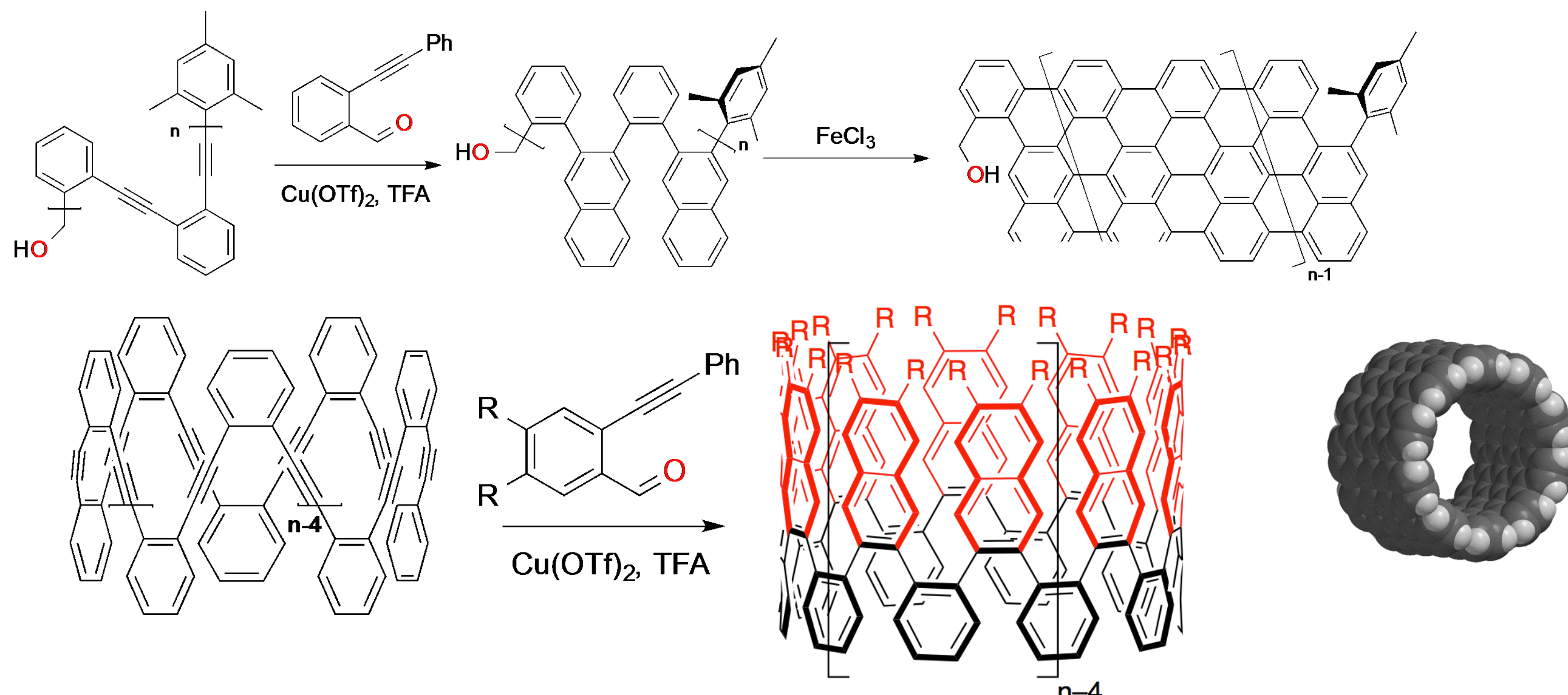
Reaction IV



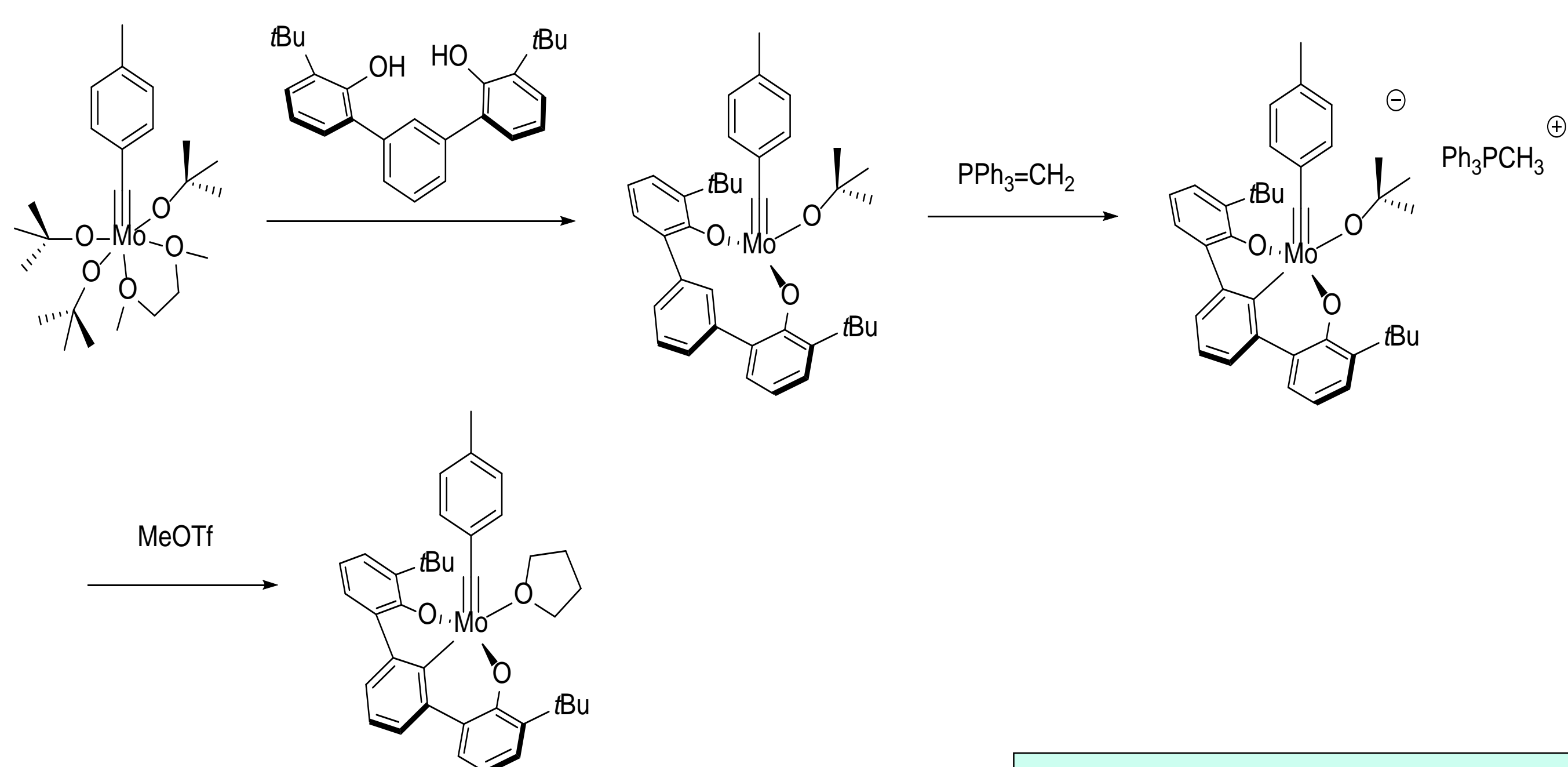
Overview of the Research Project

Synthesis of molybdenum catalytic compounds – conjugated polymers

Cyclic Templates for Carbon-Rich Materials



Scheme I: Proposed Pathway for Selected Intermediate Compounds^{3,4}



Cloke, R.; Fischer, F. R.

Kofi Opong-Mensah, Ph.D.

Email: mentlab@gmail.com

Phone: (510) 672-3307

Discussion and Conclusion

- Reactions in air and water free media
- Useful intermediates formed, Compounds I, II, III, IV
- Further work: Analogs of compounds for structure reactivity studies

References

1. Bellone, D. E.; Bours, J.; Menke, E. M.; Fischer, F. R. *J. Am. Chem. Soc.* **2015**, *137*, 850-856.
2. O'Reilly, M. E.; Ghiviriga, I.; Abboud, K. A.; Veige, A. S. *Dalton Trans.* **2013**, *42*, 3326-3336

Acknowledgment

We like to thank NSF, IISME, and the Center for E³S at the University of California at Berkeley for this research opportunity. Prof. Eli Yablonovitch, Dr. Michael Bartl, Fanny Li, and the program staff are acknowledged for organizing and coordinating this summer program. Particular thanks are given to Felix Fischer, Dr. Hyangsoo Jeong and Dr. Steven V. Kulgegen for guiding and assisting the research project. Lastly, a big thank you to all the people who made this unique opportunity possible.

Support Information

This work was funded by the National Science Foundation under Award EEC-1405547, and made use of resources in the Center for Energy Efficient Electronics Science (E³S) supported by the National Science Foundation (Award 0939514).

