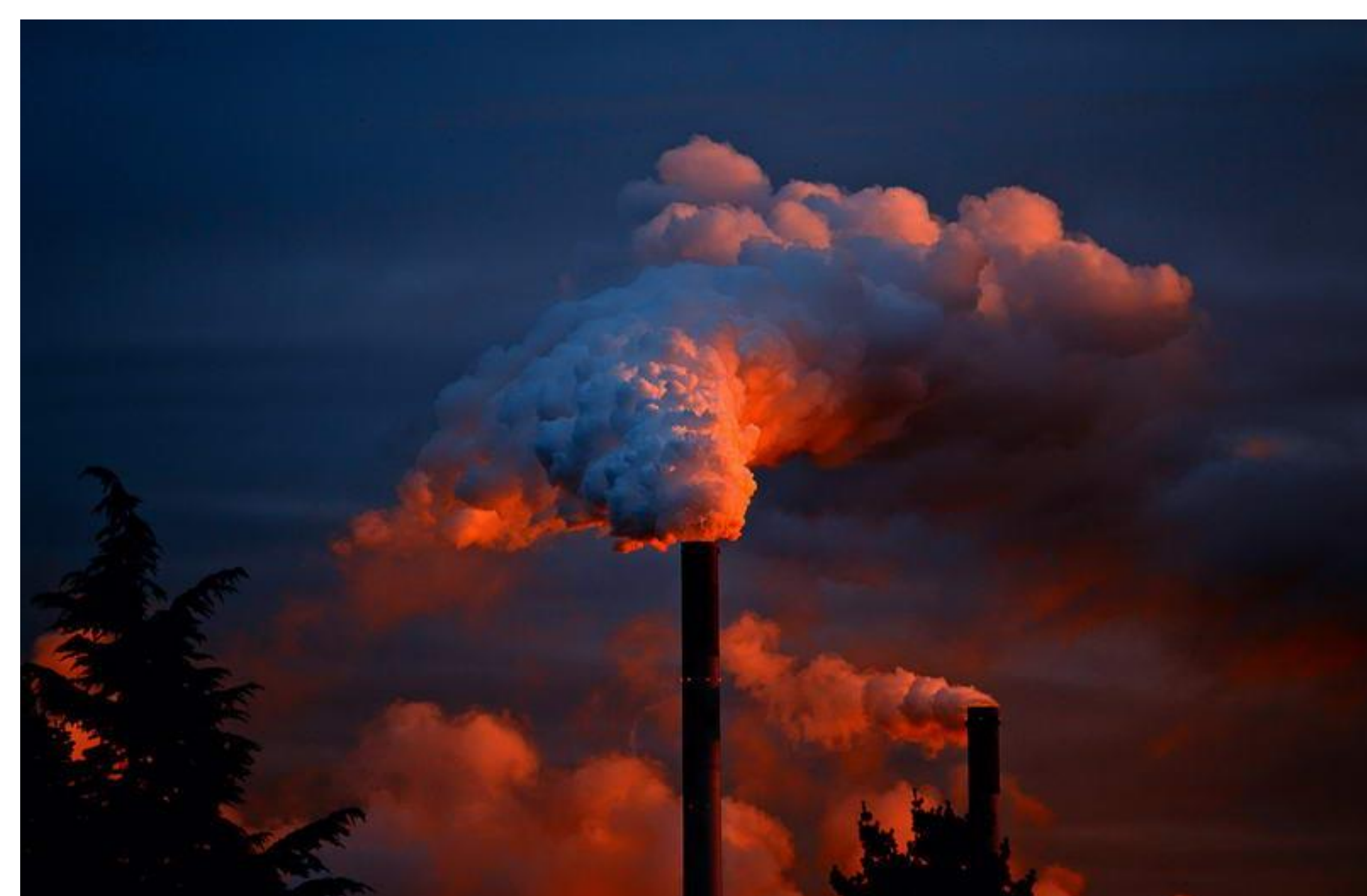
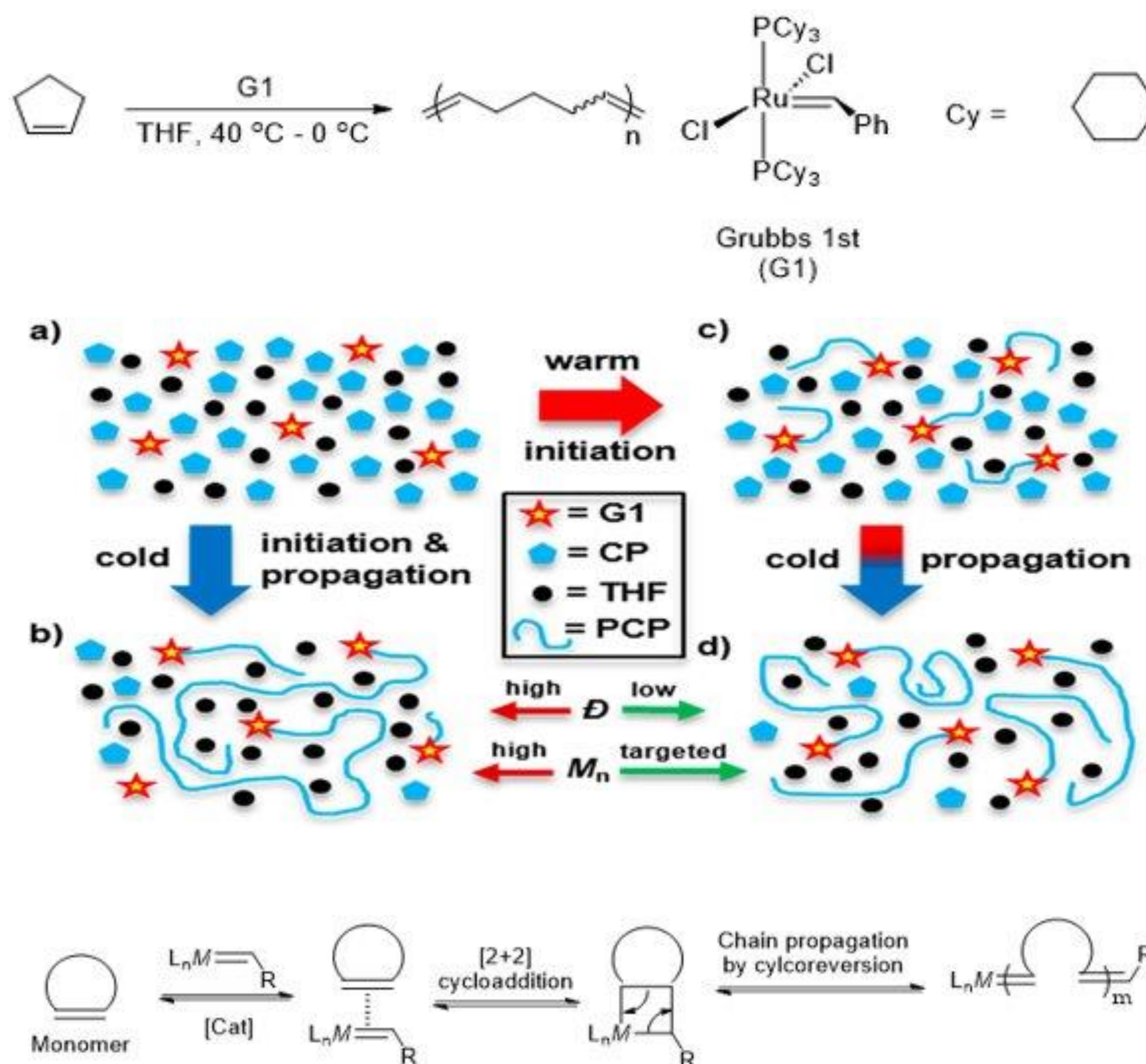


Background: Humans everywhere utilize plastic products everyday as they are convenient for busy, on the go lives of people today. This includes rubbers, glues, and styrofoams. Behind the convenience lies collateral damage to our planet. From dumping plastic waste into our oceans, to burning plastic which leaks harmful gasses into our atmosphere; still leaving tons of plastic waste behind. This is because a lot of polymers are not depolymerizable at all. This is the drive behind our research. To create a healthier planet through elastomeric chemical research. We are using a chemical which can be synthesized using a unique method called VT-ROMP, turning our chemical into rubbers and plastics which can be depolymerized.

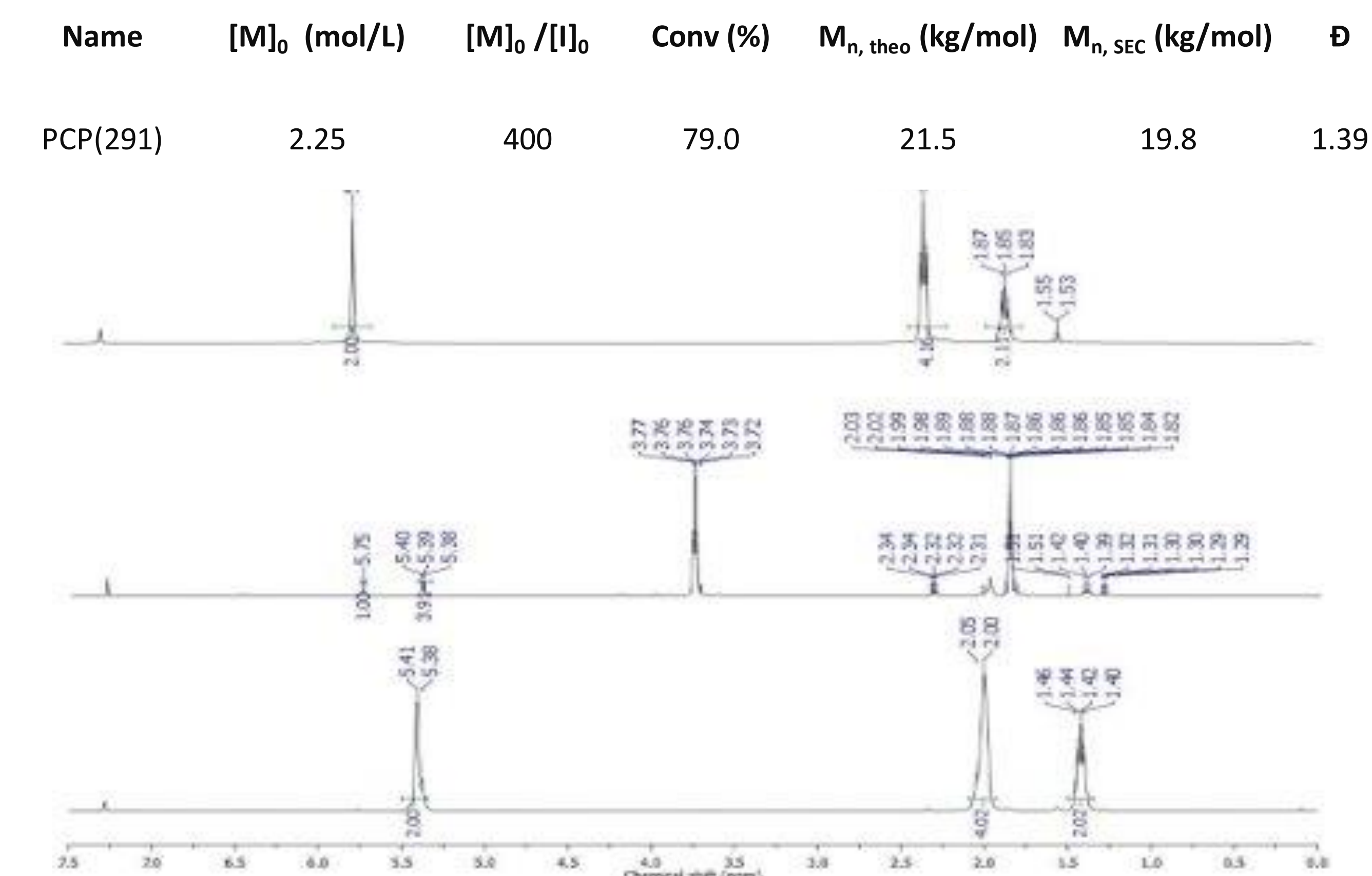


"Harmful Gasses Released By Synthetic Rubber Manufacturing Industries"

Methods:

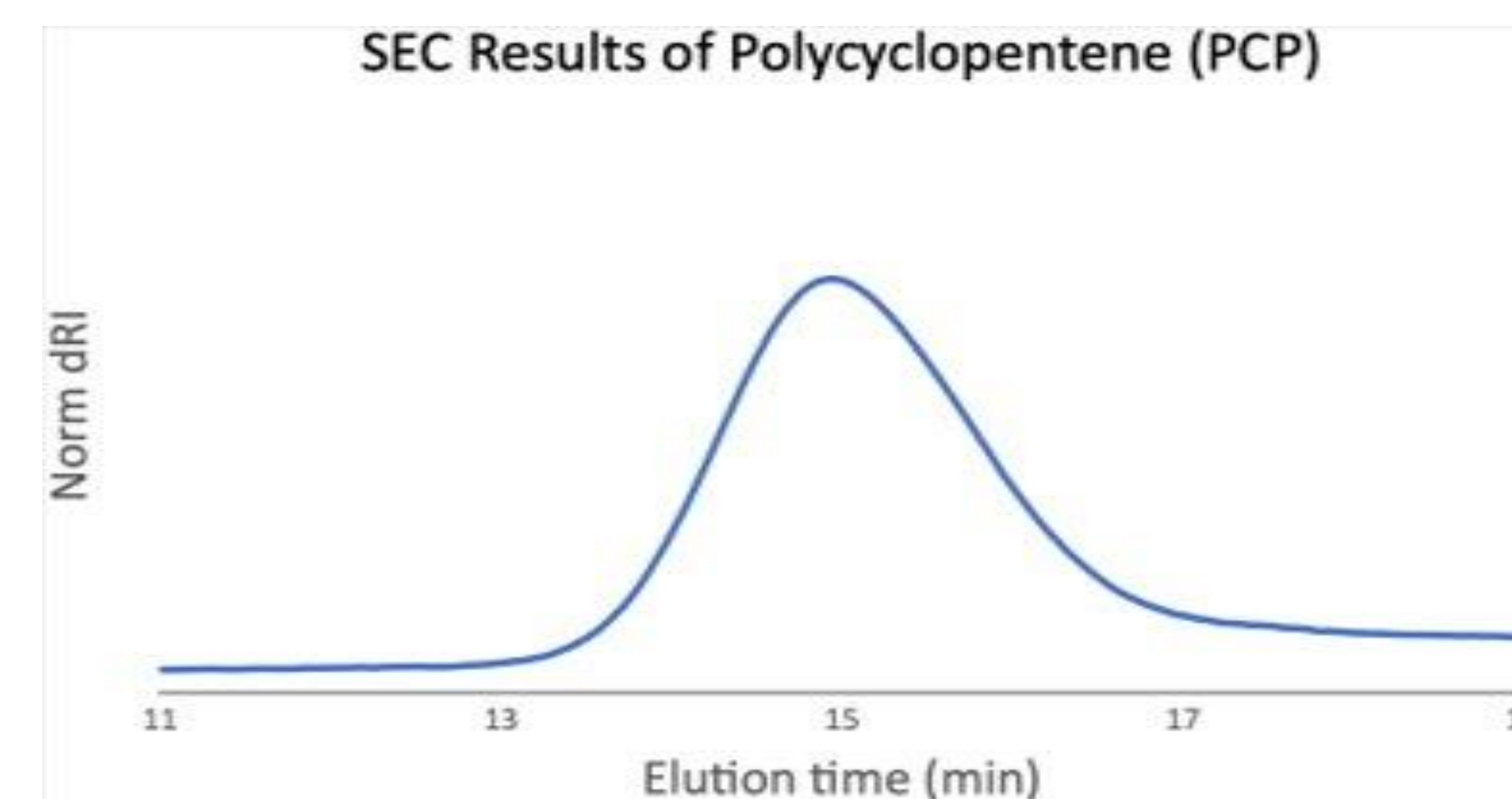


Data:

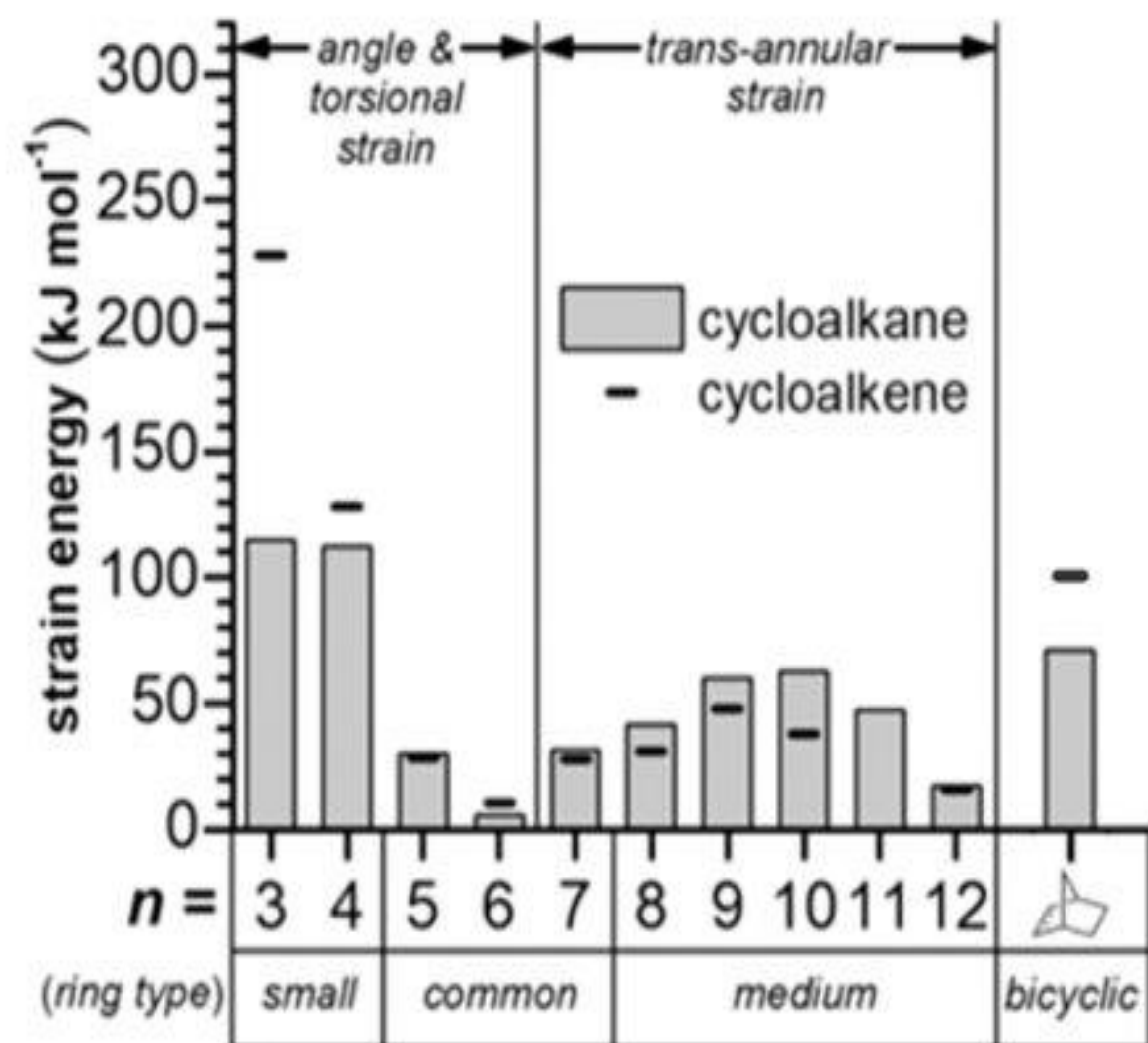


• Nuclear Magnetic Resonance (NMR)

SEC Results of Polycyclopentene (PCP)

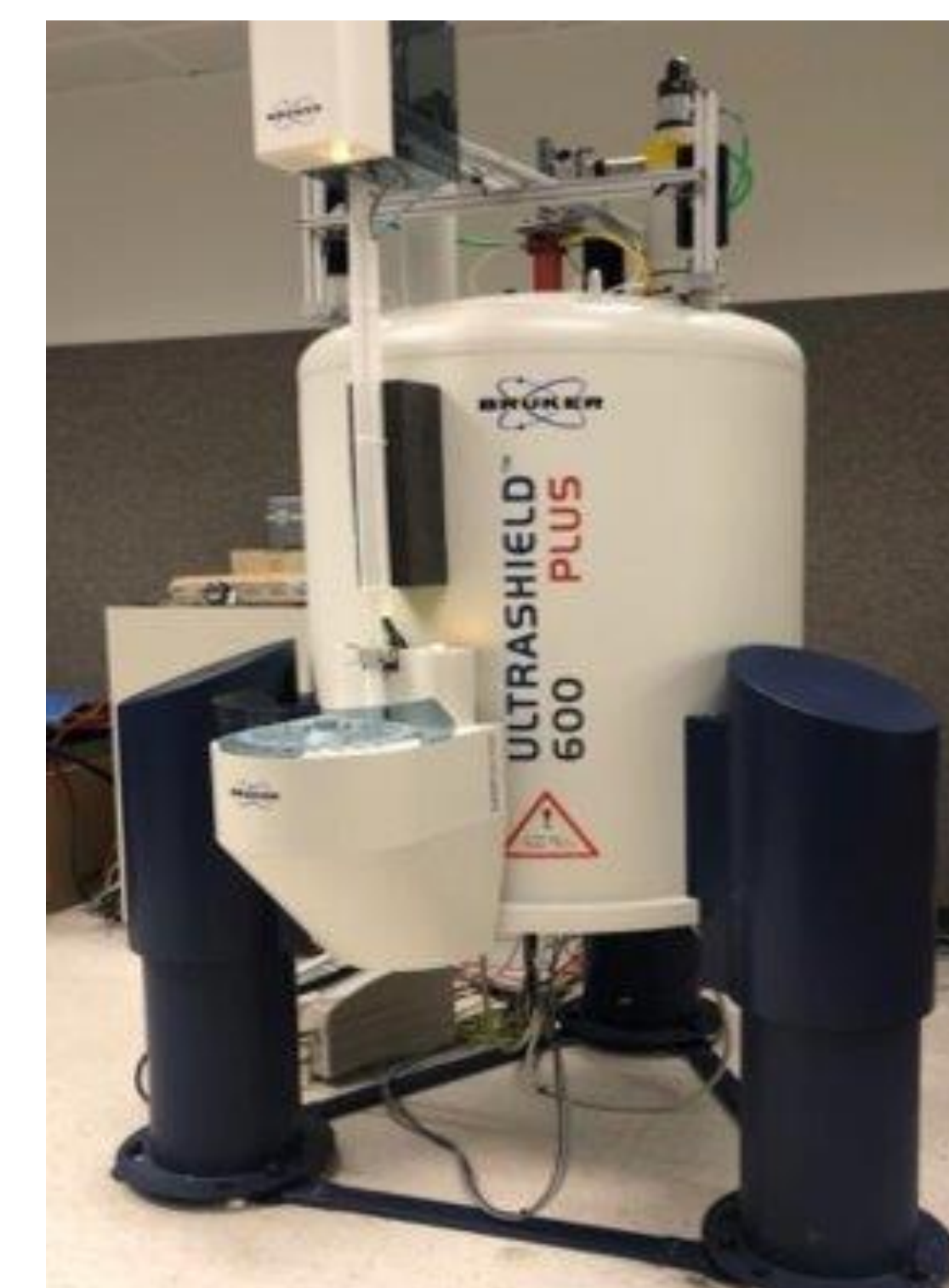
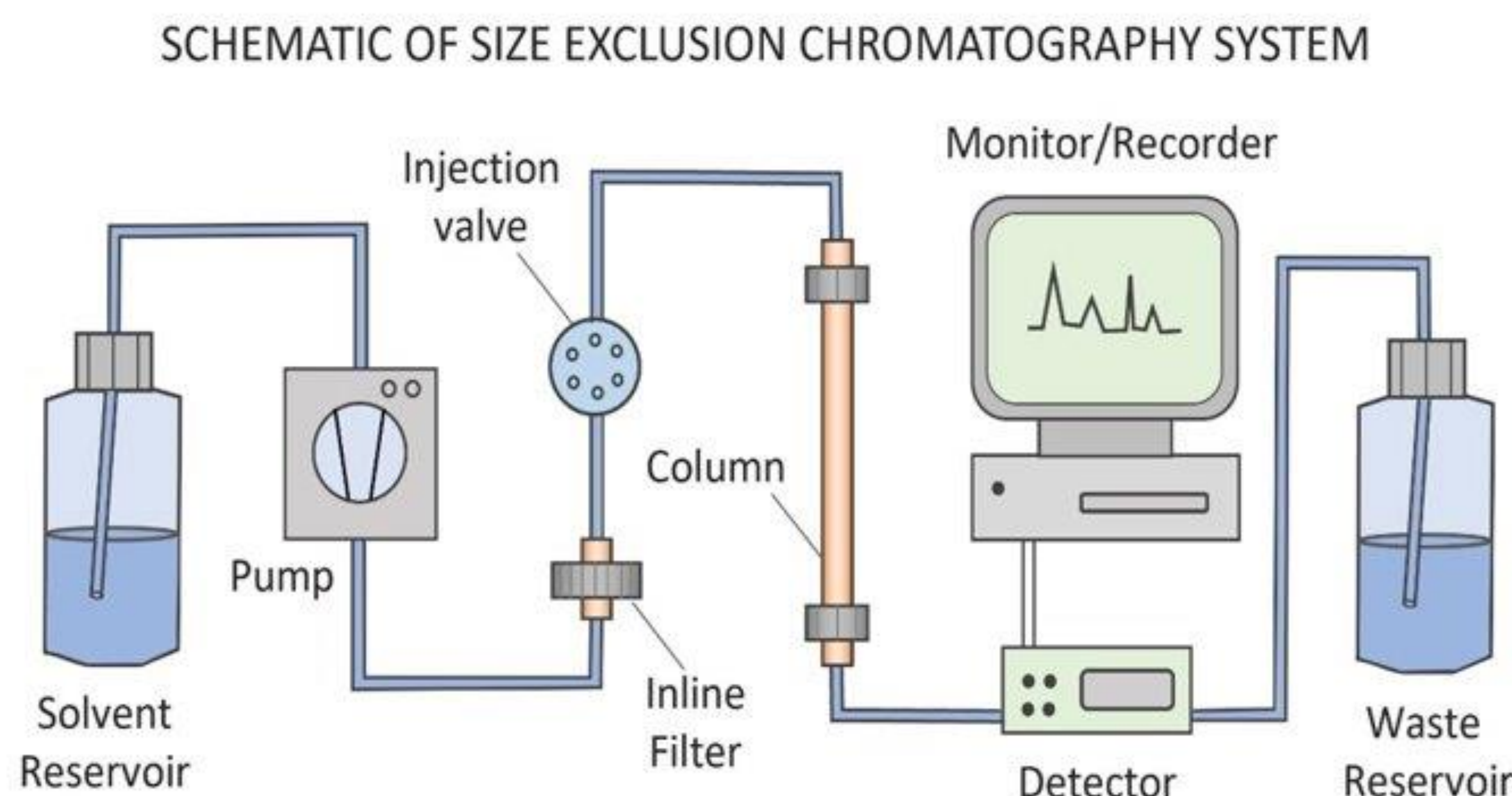


• Size Exclusion Chromatography (SEC)



- ΔH_p (CP) = - 23.4 kJ mol⁻¹
- ΔS_p (CP) = - 77 J mol⁻¹ K⁻¹
- $\Delta G_p = \Delta H_p - T\Delta S_p$
- Elastomeric materials utilize basic thermodynamic principals for both polymerization and depolymerization

Instruments:



Conclusion: Data shows a successful synthesis of PCP, targeted molecular weight and conversion is shown by NMR and SEC data. As well, low dispersity has been achieved. The data shows that VT-ROMP is effective.

Acknowledgments: A special thanks to... UROP Colloquium, Umicore, NSF, Florida State University

References:

- Neary, W. J.; Kennemur, J. G. Polypentenamer Renaissance: Challenges and Opportunities. *ACS Macro Letters* **2018**, 8 (1), 46–56.
- Tuba, R.; Grubbs, R. H. Ruthenium Catalyzed Equilibrium Ring-Opening Metathesis Polymerization of Cyclopentene. *Polymer Chemistry* **2013**, 4 (14), 3959.
- Neary *et al.* *Macromolecules* **2017**, 50, 4935–4941.
- admin, About the Author: "Harmful Gasses Released by the Synthetic Rubber Manufacturing Industries " Premiumflipflops.com." *PremiumFlipflops.com*, 24 Feb. 2023