

Swelling Dynamics of Liquid Crystalline Elastomers

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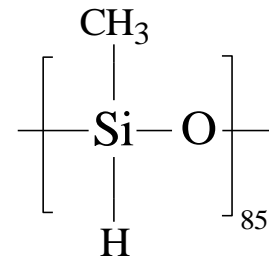
Outline

- ✓ **Liquid crystal elastomer (LCE) sample details and preparation**
- ✓ **Analysis of swelling based on Van der Waals intermolecular potential**
- ✓ **Solvent swelling experiment**
- ✓ **Solvent vapor swelling experiment**

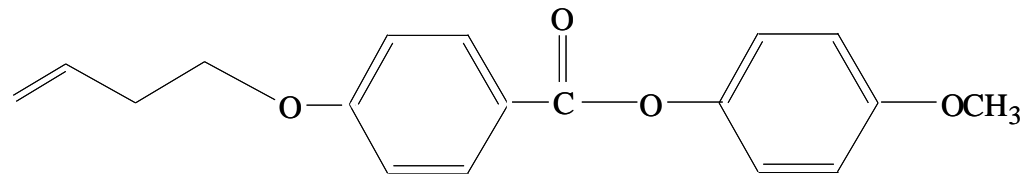
LCE Details & Preparation

Finkelmann Spin Cast Nematic side chain LCE

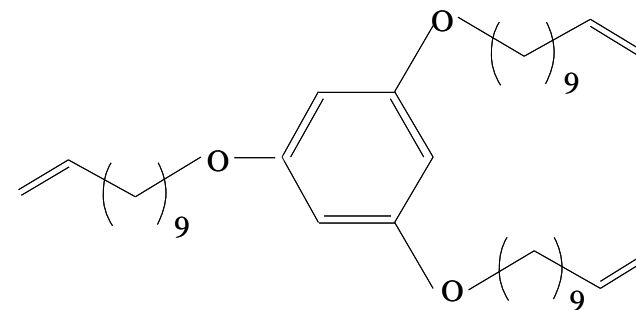
methylsiloxane backbone



**biphenyl mesogen
(side group)**



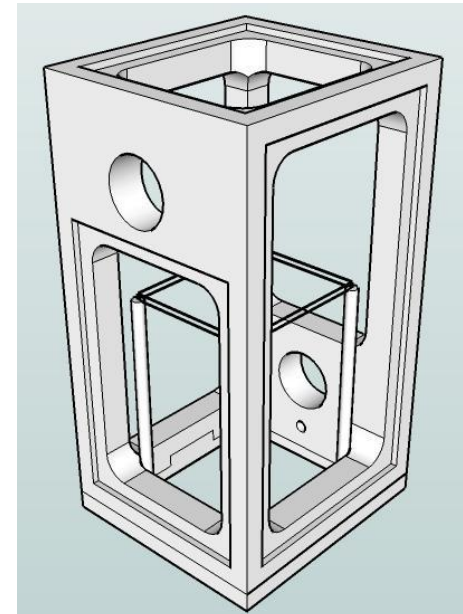
**tri-functional
crosslinker**



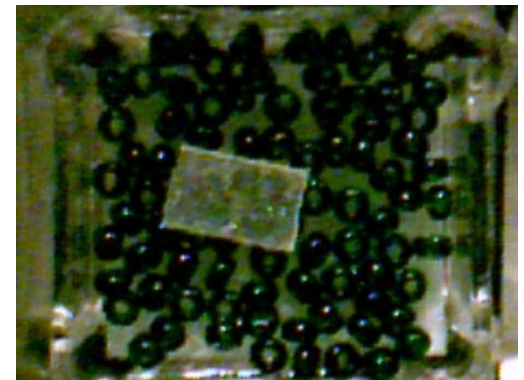
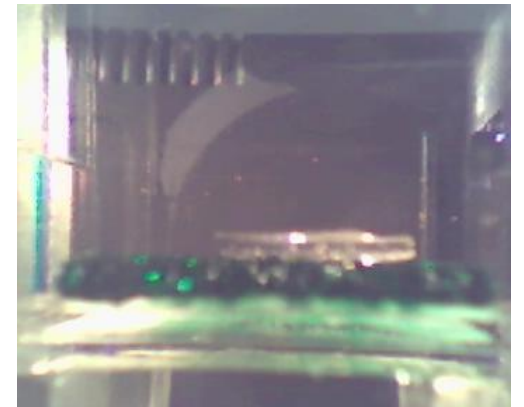
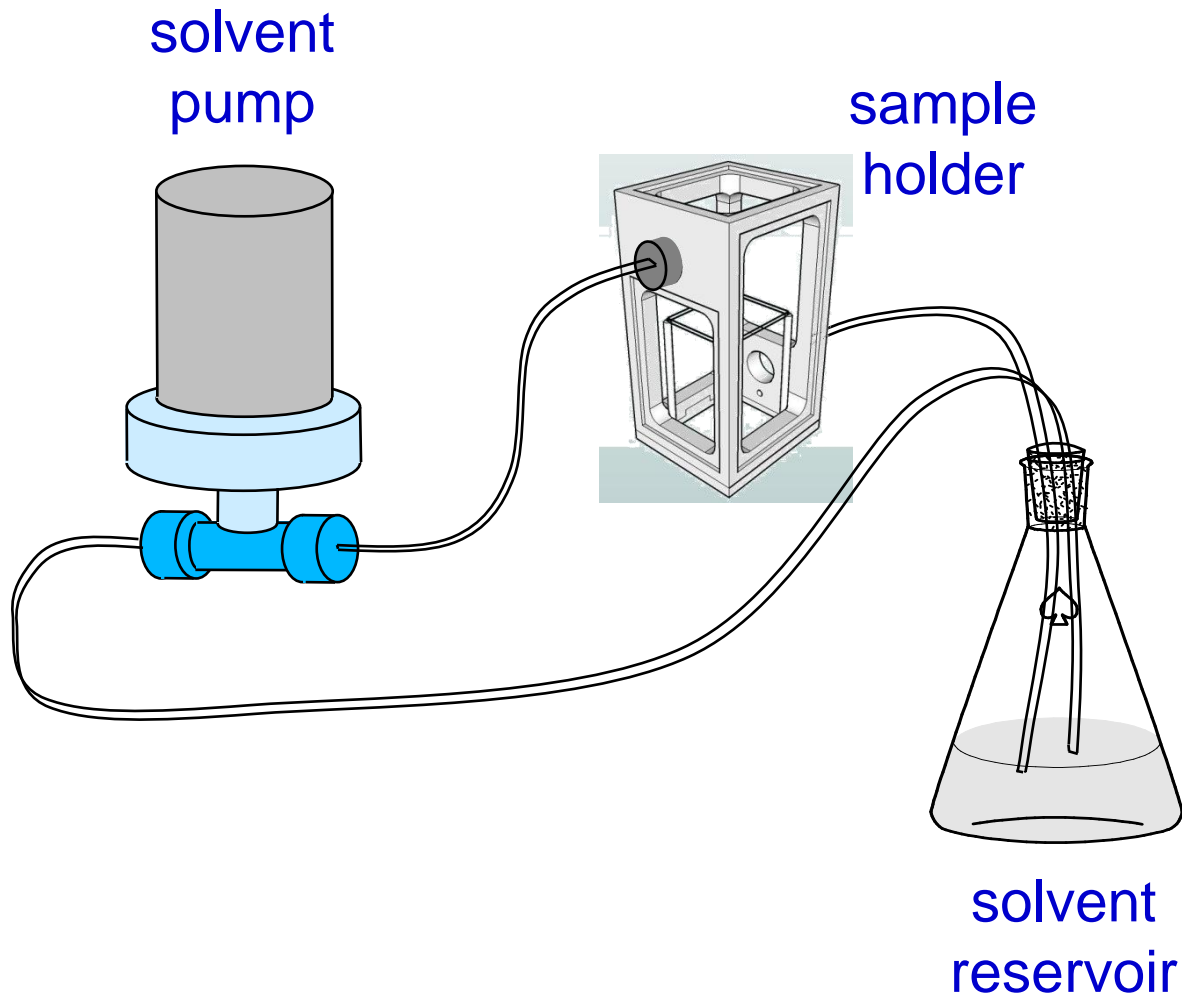
Simple Analysis

Solvent Swelling Experiment

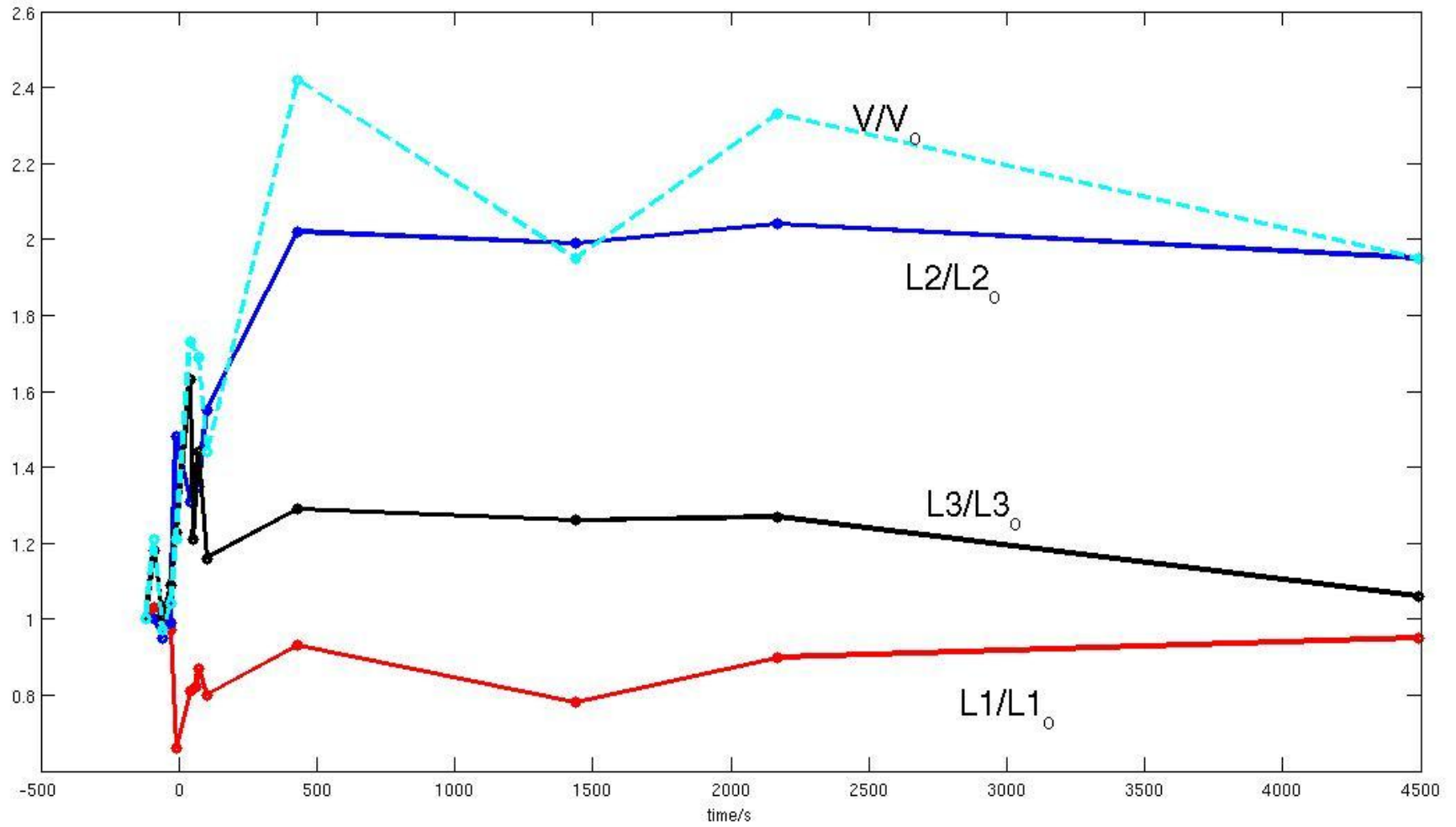
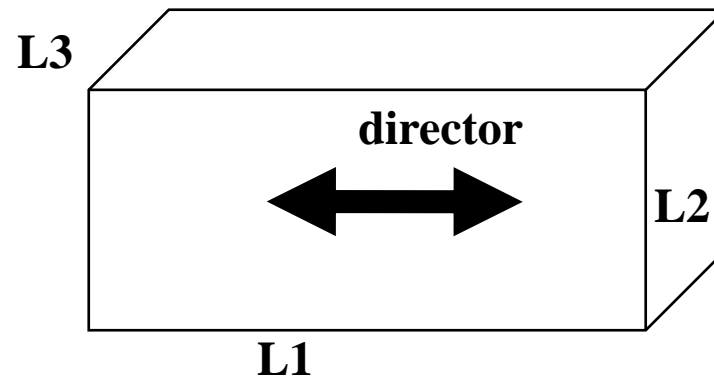
- **Designed measurement cell to simultaneously monitor**
- **Initial problems:**
 - **Solvent leaking**
 - **UV glue degradation**



Swelling Experiment

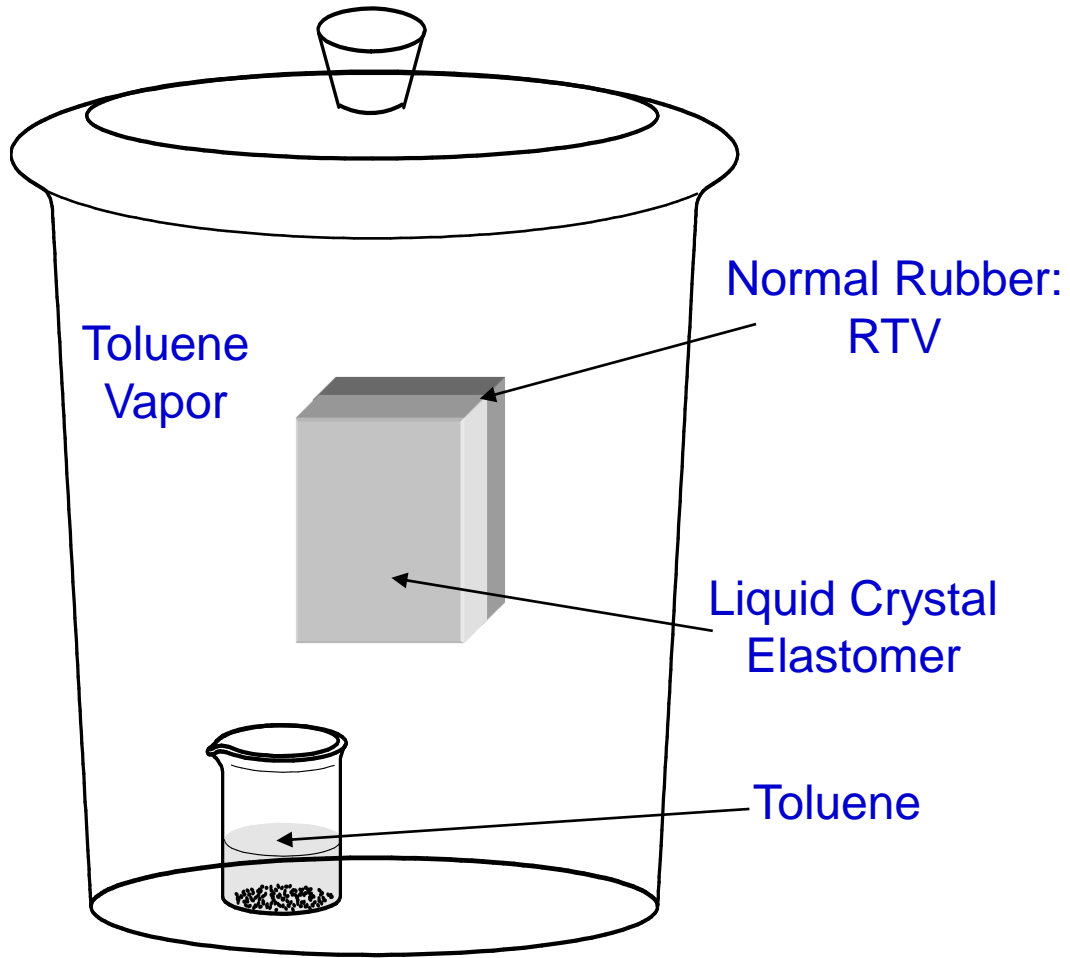


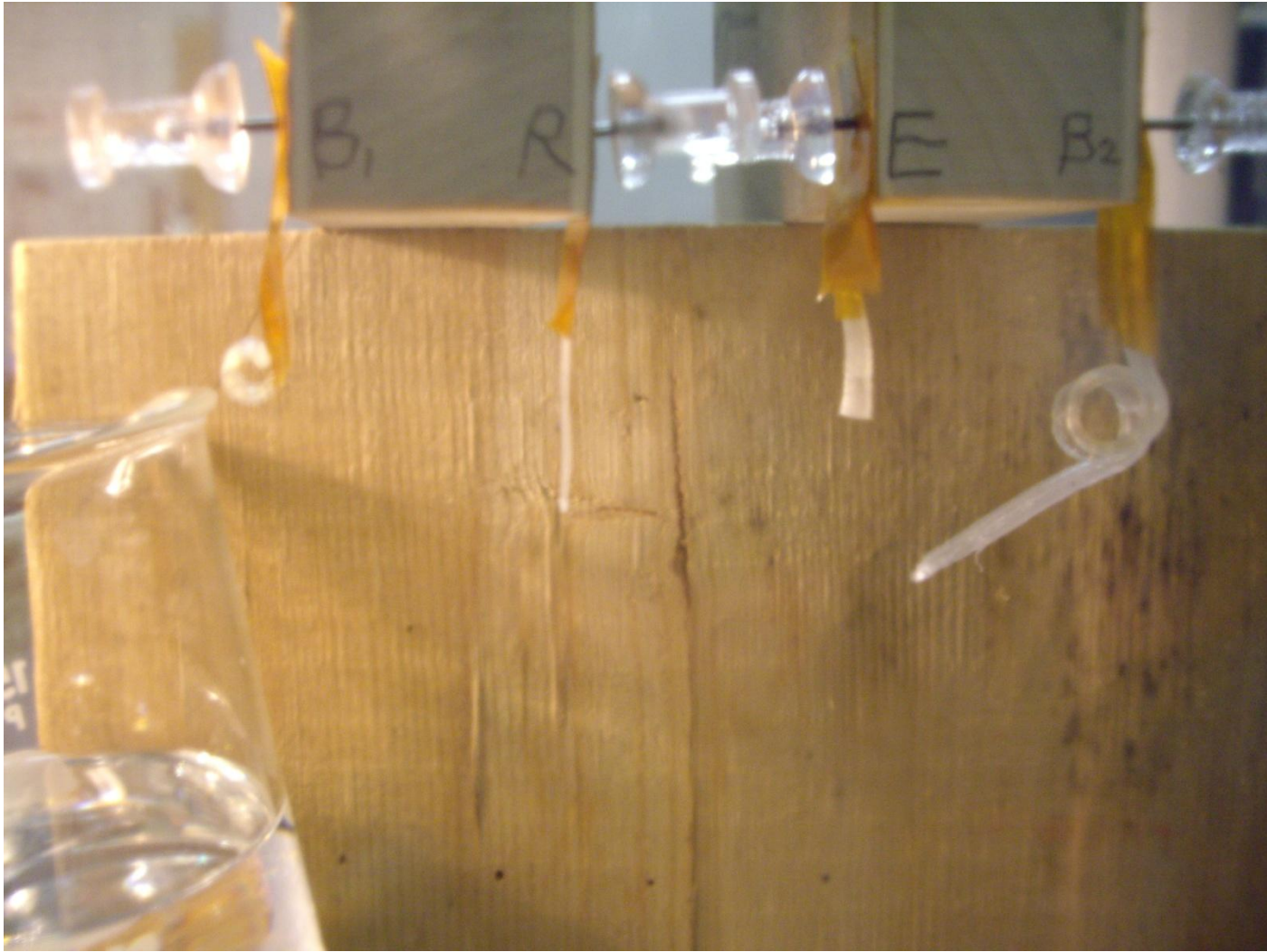
LCE



Solvent Vapor Swelling

LCE Bi-Rubber Strip Swelling





Conclusion

Thanks to:

Jeremy taught me how to use those machines in machine shop and supervised my activities, **Paul** who showed me how to make the elastomers, **Michele** who lent me a key to the lab, and **Jake** who told jokes sometimes.