

## REFERENCES

1. Rimdusit, S. and Ishida, H. (2000) Development of New Class of Electronic Packaging Materials Based on Ternary Systems of Benzoxazine, Epoxy, and Phenolic Resins. Polymer, 41: 7941-7949.
2. Mathot, V. B. F. (1994) Calorimetry and Thermal Analysis of Polymers. Munnich: Hanser.
3. Hatakeyama, T. and Quinn, F. X. (1994). Thermal Analysis: Fundamental and Applications to Polymer Science. New York: John Wiley & Sons, Inc.
4. Kissinger, H.E. (1957) Reaction Kinetics in Differential Thermal Analysis. Anal. Chem., 29: 1702-1707.
5. Ozawa, T. (1965) Bull. Chem. Soc. Jpn., 38: 1881.
6. Dutta, A. and Ryan, M. E. (1979) Effect of Fillers on Kinetics of Epoxy Cure. J. Appl. Polym. Sci., 24: 635-649.
7. Koenig, J. L. (1999) Spectroscopy of Polymer. 2<sup>nd</sup> Amsterdam: Elsevier.
8. Fadini, A. and Schnepel, F. -M. (1989) Vibrational Spectroscopy: Methods and Applications. New York: John Wiley & Sons, Inc.
9. Stuart, B. H. (2002) Polymer Analysis. New York: John Wiley & Sons, Inc.
10. Feit, E. D. and Wilkins, C. W. Jr. (1982) Polymer Materials for Electronic Applications. ACS symposium series 184. Washington. D. C.: American Chemistry Society.
11. Lupinski, J. H. and Moore, R. S. (1989) Polymer Materials of Electronics Packaging and Interconnections. ACS symposium series 407. Washington. D. C.: American Chemistry Society.
12. Holly, F. W. and Cope, A. C. (1944) Condensation Products of Aldehydes and Ketones with o-Aminobenzyl Alcohol and o-Hydrobenzylamine J. Am. Chem. Soc., 66: 1875-1879.
13. Ning, X. and Ishida, H. (1994) Phenolic Materials via Ring-Opening Polymerization Synthesis and Characterization of Bisphenol A Based Benzoxazines and Their Polymers. J. Polym. Sci., Polym. Chem. Ed., 32: 1121-1129.

14. Burke, W. J. (1949) 3,4-Dihydro-1,3,2H-Benzoxazines: Reaction of p-Substituted Phenols with N,N-Dimethylamines. J. Am. Chem. Soc., 71: 609-612.
15. Burke, W. J., Bishop, J. L., Glennie, E. L. M., and Bauer W. N. (1965) A New Aminoalkylation Reaction: Condensation of Phenols with Dihydro-1,3-oxazines. J. Org. Chem., 30: 3423-3427.
16. Shreiber, H. (1973) German Offen. No. 2225504.
17. Shreiber, H. (1973) German Offen. No. 2323936.
18. Riess, G., Schwob, J. M., Guth, G., Roche, M., and Lande, B. (1985) Ring-Opening Polymerization of Benzoxazine. Advances in Polymer Science and Technology. 31: Culbertson, B. M. and McGrath, J. E., Eds., Plenum: New York, 27-49.
19. Ning, X. and Ishida, H. (1994) Phenolic Materials via Ring-Opening Polymerization of Benzoxazines: Effect of Molecular Structure on Mechanical and Dynamic Mechanical Properties. J. Polym. Sci., Polym. Phys. Ed., 32: 921-927.
20. Ishida, H. and Rodriguez, Y. (1995) Curing Kinetics of a New Benzoxazine based Phenolic Resin by Differential Scanning Calorimetry. Polymer, 36: 3151-3158.
21. Ishida, H. and Allen, D. J. (1996) Physical and Mechanical Characterization of Near-Zero Shrinkage Polybenzoxazines. J. Polym. Sci., Polym. Phys. Ed., 34: 1019-1030.
22. Ishida, H. and Allen, D. J. (1996) Mechanical Characterization of Copolymers Based on Benzoxazine and Epoxy. Polymer, 37: 4487-4495.
23. Kimura, H. Matsumoto, A. Hasegawa, K., Ohtsuka, K., and Fukada, A. (1998) Epoxy Resin Cured By Bisphenol A Based Benzoxazine. J. Appl. Polym. Sci., 68: 1903-1910.
24. Kimura, H. Matsumoto, A. Hasegawa, K., and Fukada, A. (1999) New Thermosetting Resin From Bisphenol A Based Benzoxazine and Bisoxazoline. J. Appl. Polym. Sci., 72: 1551-1558.

25. Kimura, H., Taguchi, S., and Matsumoto, A. (2001) Studies on New Type of Phenolic Resin (IX) Curing Reaction of Bisphenol A Based Benzoxazine with Bisoxazoline and the Properties of the Cured Resin II: Cure Reactivity of Benzoxazine. J. Appl. Polym. Sci., 79: 2331-2339.
26. Ishida, H. and Low, H. Y (1997) A Study of Volumetric Expansion of Benzoxazine Based Phenolic Resin. Macromolecules, 30: 1099-1106.
27. Wirasate, S., Dhumrongvaraporn, S., Allen, D., and Ishida, H. (1998) Molecular Origin of Unusual Physical and Mechanical Properties in Novel Phenolic Materials Based on Benzoxazine Chemistry. J. Appl. Polym. Sci., 70: 1299-1306.
28. Rimdusit, S. and Ishida, H. (2001) US. Patent 6207786.
29. Rimdusit, S. and Ishida, H. (2000) Synergism and Multiple Mechanical Relaxations Observed in Ternary Systems Based on Benzoxazine, Epoxy, and Phenolic Resins. J. Polym. Sci., Polym. Phys. Ed., 38: 1687-1698.
30. Rimdusit, S. and Ishida, H. (2002) Gelation Study of High Processability and High Reliability Ternary System Based On Benzoxazine, Epoxy, and Phenolic Resins For An Application As Phenolic Packaging Materials. Rheol Acta, 41: 1-9.
31. Ishida, H. and Lee, Y. -H. (2001) Infrared and Thermal Analyses of Polybenzoxazine and Polycarbonate Blends. J. Appl. Polym. Sci., 81: 1021-1034.
32. Ishida, H. and Lee, Y. -H. (2002) Study of Exchange Reaction in Polycarbonate-Modified Polybenzoxazine via Model Compound. J. Appl. Polym. Sci., 83: 1848-1855.
33. Ishida, H. and Lee, Y. -H. (2001) Study of Hydrogen Bonding and Thermal Properties of Polybenzoxazine and Poly( $\epsilon$ -caprolactone) Blends. J. Polym. Sci., Polym. Phys. Ed., 39: 736-749.

34. Ishida, H. and Lee, Y. -H. (2001) Synergism Observed in Polybenzoxazine and Poly( $\epsilon$ -caprolactone) Blends By Dynamic Mechanical and Thermogravimetric Analysis. Polymer, 42: 6971-6979.
35. Wang, Y. -X and Ishida, H. (1999) Cationic Ring-Opening Polymerization of Benzoxazines. Polymer, 40: 4563-4570.
36. Wang, Y. -X and Ishida, H. (2000) Synthesis and Properties of New Thermoplastic Polymers from Substituted 3,4-Dihydro-2H-1,3-benzoxazine. Macromolecules, 33: 2839-2847.
37. Rimdusit, S. and Tanthapanichkoon, W. (2001) 11<sup>th</sup> Thailand Chemical Engineering and Applied Chemistry Conference, Nakhonratchasima, Thailand. Thermal Property Enhancement Observed in Ternary Systems Based on Benzoxazine, Epoxy, and Phenolic Resins.
38. Dunkers, J. and Ishida, H. (1999) Reaction of Benzoxazine Based Phenolic Resins with Strong and Weak Carboxylic Acids and Phenols as Catalyst. J. Polym. Sci., Polym. Chem., 37: 1913-1921.
39. Ishida, H. and Allen, D. J. (2001) Gelation Behavior of Near Zero Shrinkage Polybenzoxazine. J. Appl. Polym. Sci., 79: 407-417.
40. Whittaker, A. G. Mount, A. R., and Heal, M. R. (2000) Instant Notes Physical Chemistry. Bios: Springer.

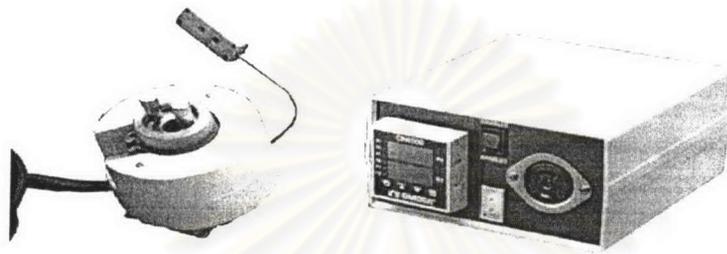


APPENDIX

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## APPENDIX

Picture of instrument and accessories used in this research.



Temperature Controller for Heated Cell (Hot Cell)

ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย

## VITAE

Miss Patcharin Kornpraditsin was born in Bangkok, Thailand, on July 26<sup>th</sup>, 1978. She received bachelor degree of science in 1998 from Department of Chemistry, Faculty of Science, Mahidol University. She started as a master degree student with a major in Polymer Science, Program on Petrochemistry and Polymer Science, Chulalongkorn University in 1999 and completed program in 2002.



ศูนย์วิทยทรัพยากร  
จุฬาลงกรณ์มหาวิทยาลัย