REFERENCES

1. Krasovitskii, B. M., and Bolotin, B. M. *Organic Luminescent Materials*. Translated by Vopian, V. G. New York: VCH Publication, **1988**. p. 7: Komorova, V. M., and Plotnikov, V. G. *Kvantovaya khimiya. (Quantum Chemistry.)* Shittintsa, Kishinev, K-121 (1975).
2. Krasovitskii, B. M., and Bolotin, B. M. *Organic Luminescent Materials*. Translated by Vopian, V. G. New York: VCH Publication, **1988**. p. 8: Nurmukhametiv, R. N. *Poglishchinie I Lyuminestsensiya aromaticheskikh soedinenity. (Absorption and Luminescence of Aromatic Compounds.)* Khimiya, Moscow (1971). Shigorin, D. N. *Zh. Vses. Khimich. obshchestva im. Mendeleeva* 20, 32 **(1975)**.
3. Pichat, L., Pesteil, P., and Cle'ment. *J. Chem. Phys.* **(1953)**. 50, p. 26.
4. Shorr, M. G., and Torney, F. Y. *Phys. Rev.* **(1950)**. 80, pp. 474-479.
5. Sandler, S. R., and Loshaek, S. *J. Chem. Phys.* **(1961)**. 34(2), pp. 439-444.
6. Barashkov, N. N., and Gunder, O. A. *Fluorescent Polymer.* London: Eillis Horwood, **1994**.
7. Soutar, I., and Toynbee. *J. Amer. Chem. Soc.; Polym. Propr.* **(1986)**. 27, p. 338.
8. Bezugly, V. D., Chernobuy, A. V., Dmitrievskaya L. I., and et al. *Scintillators and Scintillation Materials.* Kharkov, KGU **(1963)**. 3, pp. 72-79.
9. Wang, F. W., and Wu, E. S. *Polm. Comm.* **(1987)**. 28, p. 73.

10. Barashkov, N. N., and Gunder, O. A. *Fluorescent Polymers.* Translated by. Kemp, T. J. New York: Ellis Horwood, **1994.** p. 168: Bezugly, V. D., Semennko, M. G., Vlasov, V. G., and et al. *Scintillators and Scintillation Material,* Kharkov, KGU **(1963)**, 3, pp. 43-45.

11. Heisel, F., Laustriat, C., and Cocke, A. *J. Appl. Radiat. Istop.* **(1964).** 2, pp. 89-93.

12. Krasovitskii, B. M., and Bolotin, B. M. *Qrganic Luminescent Materials.* Translated by Vopian, V. G. New York: VCH Publication, **1988.** p. 7: Galeeva, A. I., Mayer, G. V., and Danilova, V. I. *Zh. Prikladn. Spektroskopii,* 35, 12 **(1981).**

13. USSR Patent No. 606,859 **(1978).**

14. Fischer, E. *Chem. Ber.* 29, p. 205 **(1896).**

15. Robinson, R. *J. Chem. Soc.* **(1909).** 95, p. 2167.

16. Gabriel, S. *Chem. Ber.* **(1910).** 43, p. 1283.

17. Wassermann, H. H. *J. Org. Chem.* **(1973)** 38, p. 2407.

18. Krasowtsky, B. M. *Chem. Heter. Compound.* **(1986).** 22, p. 2291.

19. Lakhan, R., and Ternai, B. *J. Het. Chem.* **(1972).** 14, p. 317.

20. Cornforth, J. W. *Heterocyclic Compounds.* 5, **1957.** New York: Wiley and Sons, pp. 298-336.

21. Krasovitskii, B. M., and Bolotin, B. M. *Organic Luminescent Materials.* Translated by Vopian, V. G. New York: VCH Publication, **1988.** p. 72.

22. Borel, E., and Devel, H. *Helv. Chim. Acta* **(1953).** 98, pp. 801-807.

23. Bobby, J. *Dictionary of Organic Compounds.* 5th ed. **(1982).** 2, New York: Chapman and Hall, p. 2258.

24. Koenig, K. E., and Weber, W. P. *Tetrahedron Letter.* **(1974).** 26, pp. 2275-2278.

25. Rashatasakhon, P., and Kreethadumrongdate, T. **1996.** *The Synthesis of New Fluorescent Indicators Specific to Thiol Groups in Proteins* Senior's project, Department of Chemistry, Faculty of Science, Chulalongkorn University.

26. Ternai, B. **1964.** *The Fischer Oxazole Synthesis.* Master's Thesis, Melbourne University.

27. Borel, E., and Devel, H. *Helv. Chim. Acta* **(1953).** 98, pp. 801-807.

28. Merch, J. *Advanced Organic Chemistry,* 3rd ed. New York: Wiley-Interscience, **1984.** pp. 1086-1087.

29. Fieser, L. F., and Fieser, M. *Reagents for Organic Symthesis.* New York: John Wiley and Sons, **1984.** pp. 118-119.

30. ชัชนาฎ เทพธรานนท์. ปฏิกิริยาเคมีอินทรีย์พื้นฐาน. กรุงเทพฯ: พรีเมียร์ดีซายน์. **2532.** หน้า 104.

31. Oakwood, T. S., and Weisgerber, C. A. *Organic Syntheses, Coll.* 3, pp. 113-114.

32. March, J. *Advance of Organic Chemistry.* 3rd ed. New York: Wiley-Interscience , **1984.** pp. 320-322.

33. Turchi, I. J., and Dewar, M. J. S. *Chem. Rev.* **(1975).** 75 (4), p. 408.

34. Stothers, J. B. *Carbon-13 NMR Spectroscopy.* New York: Academic Press, **1972,** p. 197.

Appendix A

DSC Thermograms of compounds (1)-(10)

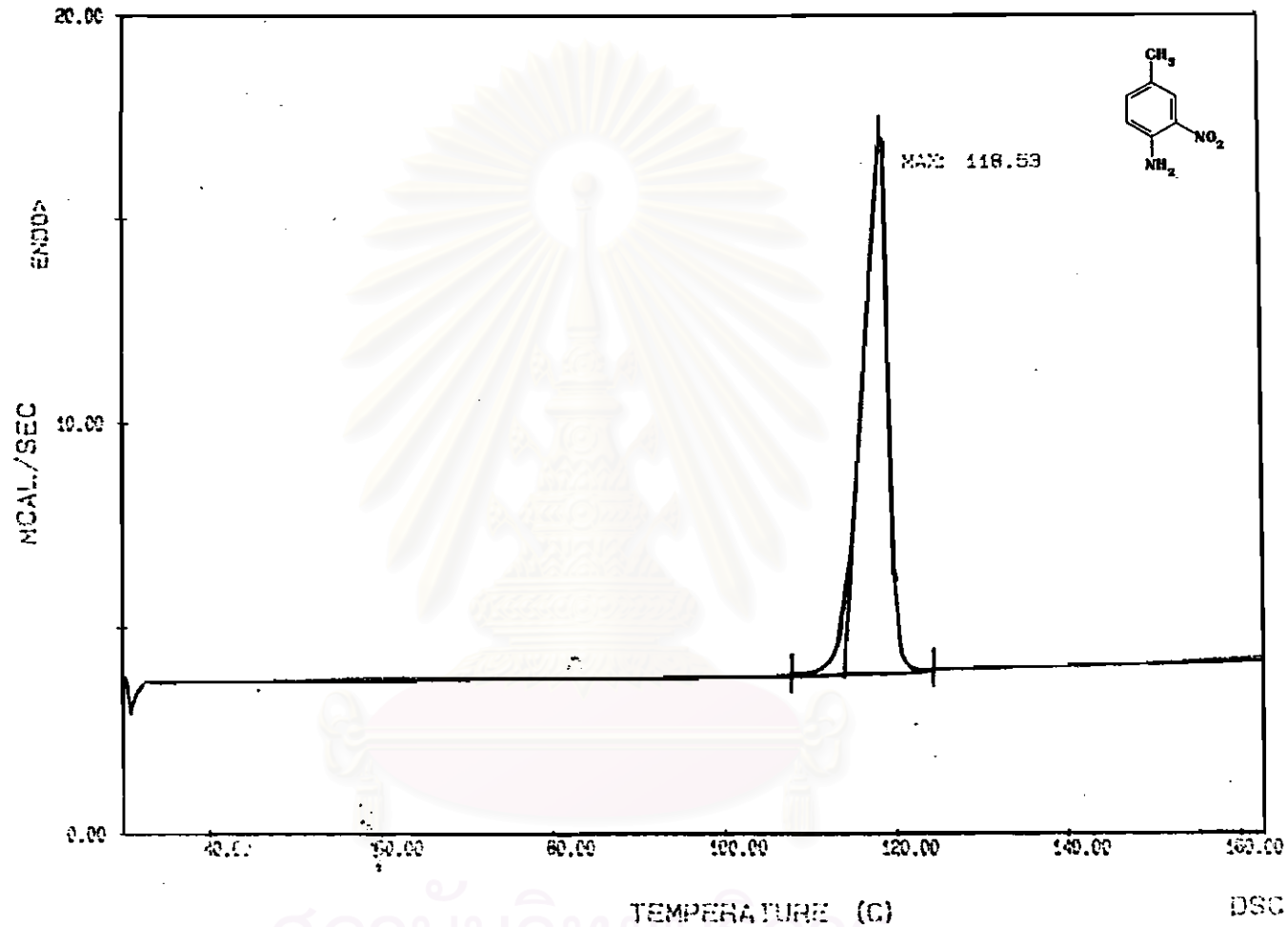

Figure A1. Melting Temperature of 3-nitro-4-toluidine measured by DSC technique.

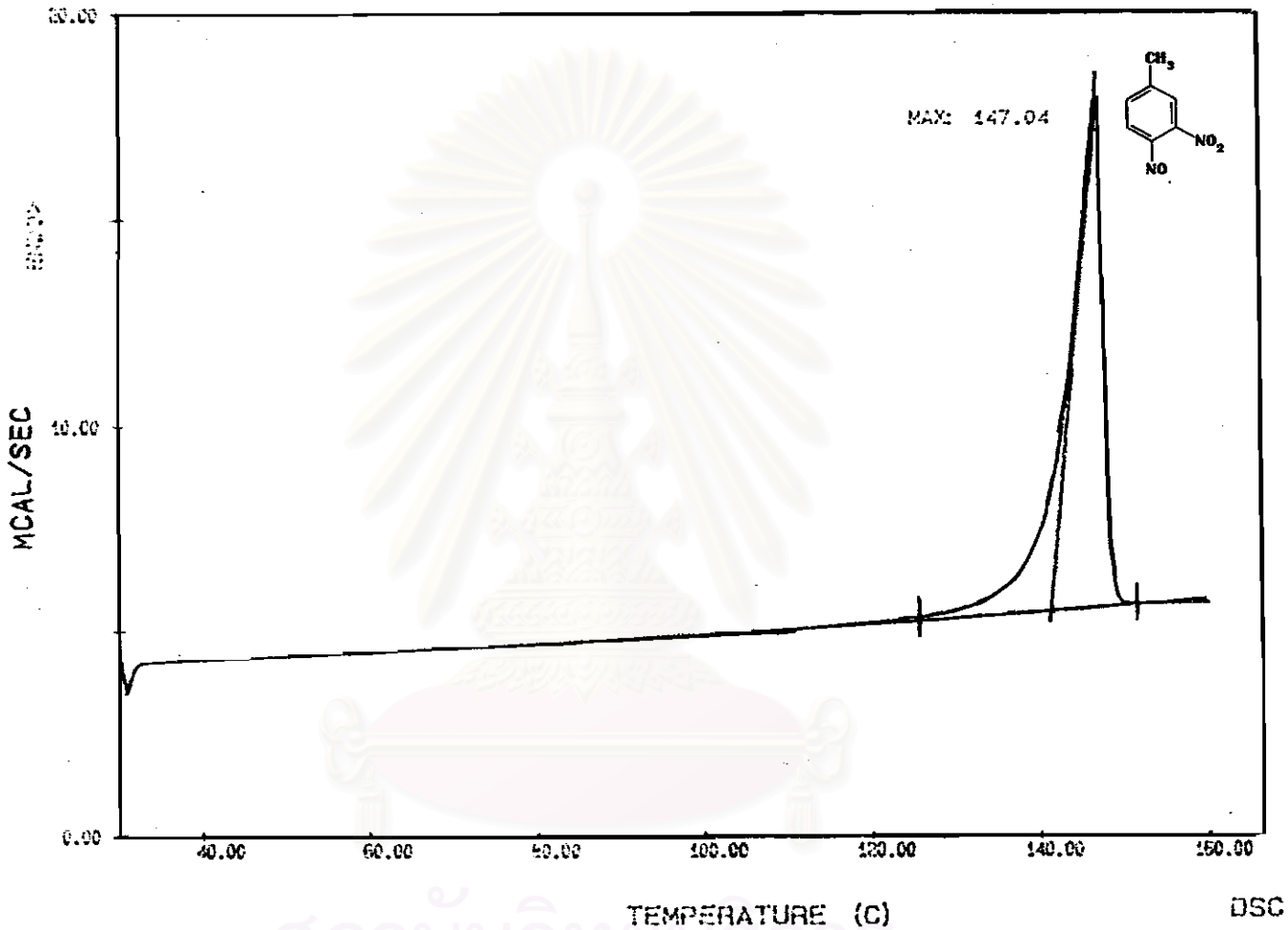

Figure A2. Melting Temperature of 3-nitro-4-nitrosotoluene measured by DSC technique.

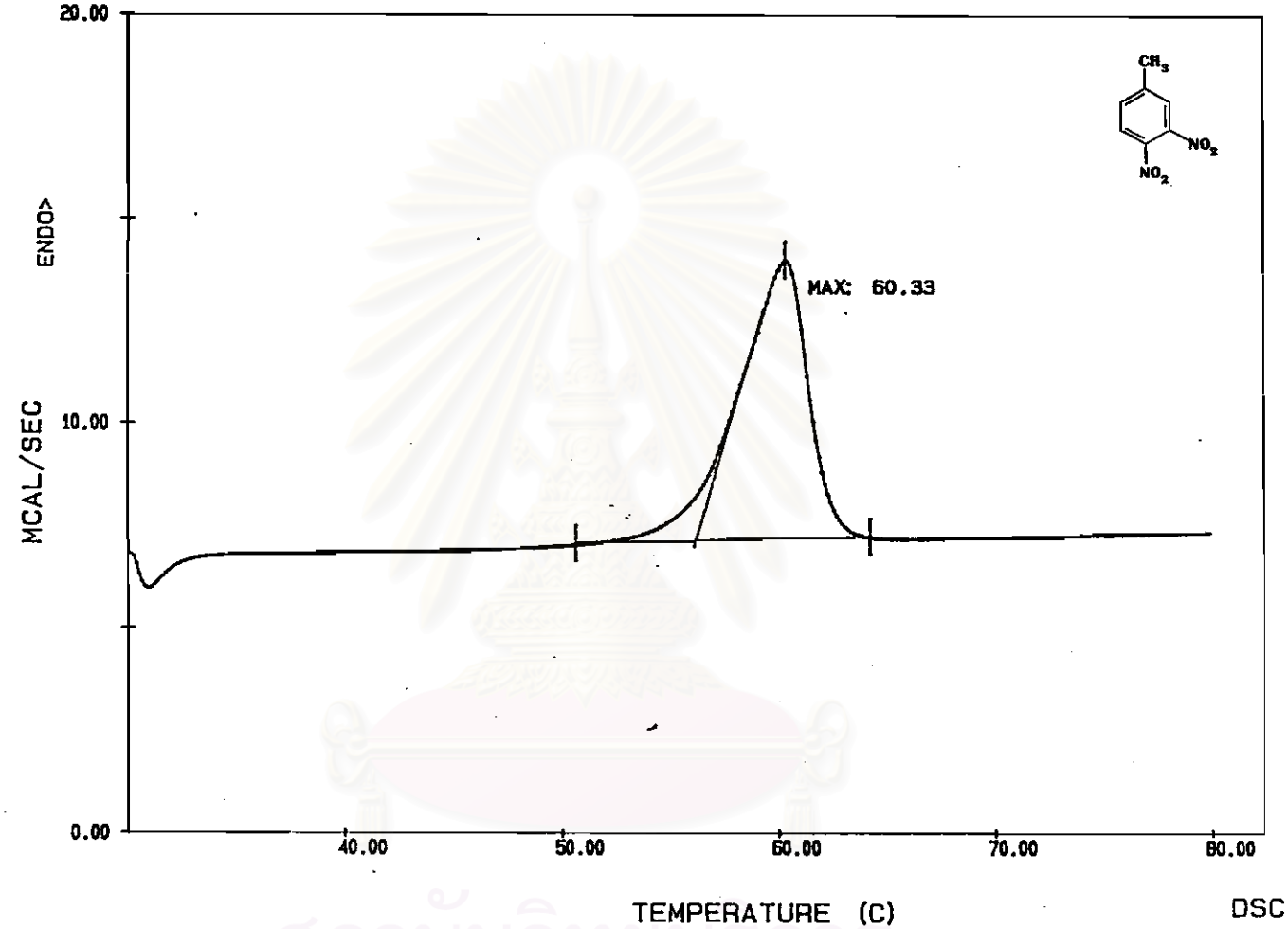

Figure A3. Melting Temperature of 3,4-dinitrotoluene measured by DSC technique.

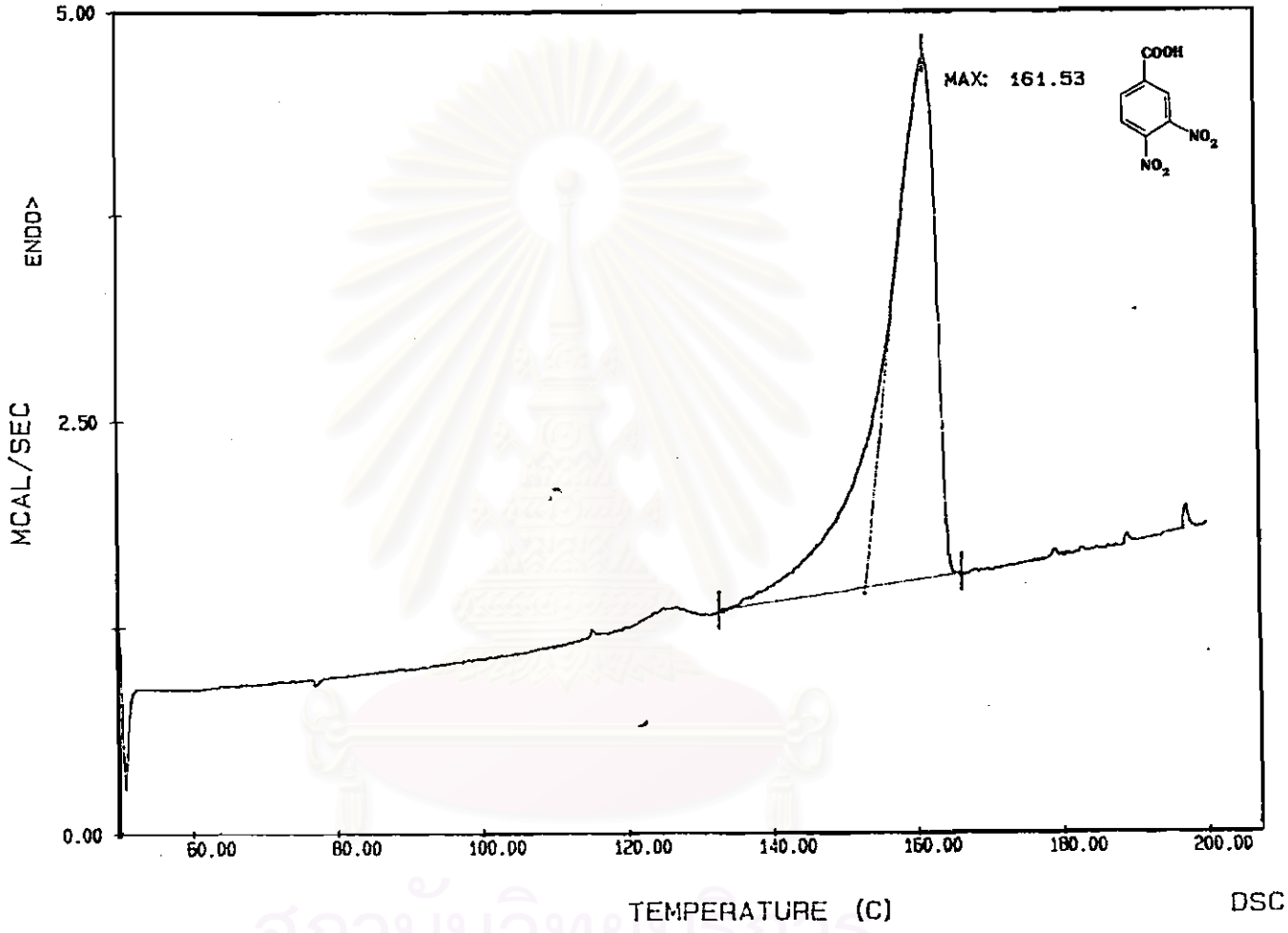

Figure A4. Melting Temperature of 3,4-dinitrobenzoic acid measured by DSC technique.

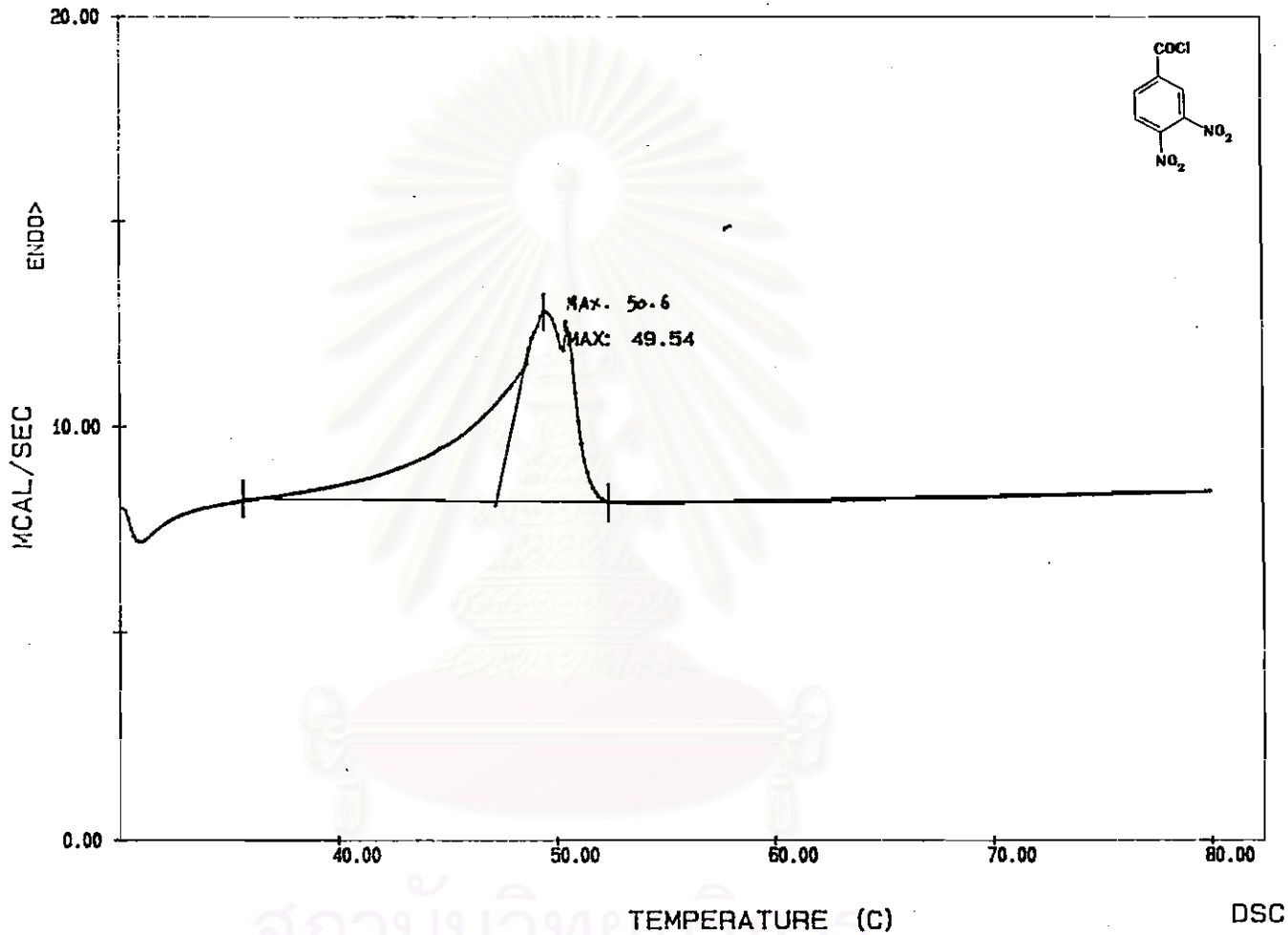

Figure A5. Melting Temperature of 3,4-dinitrobenzoyl chloride measured by DSC technique.

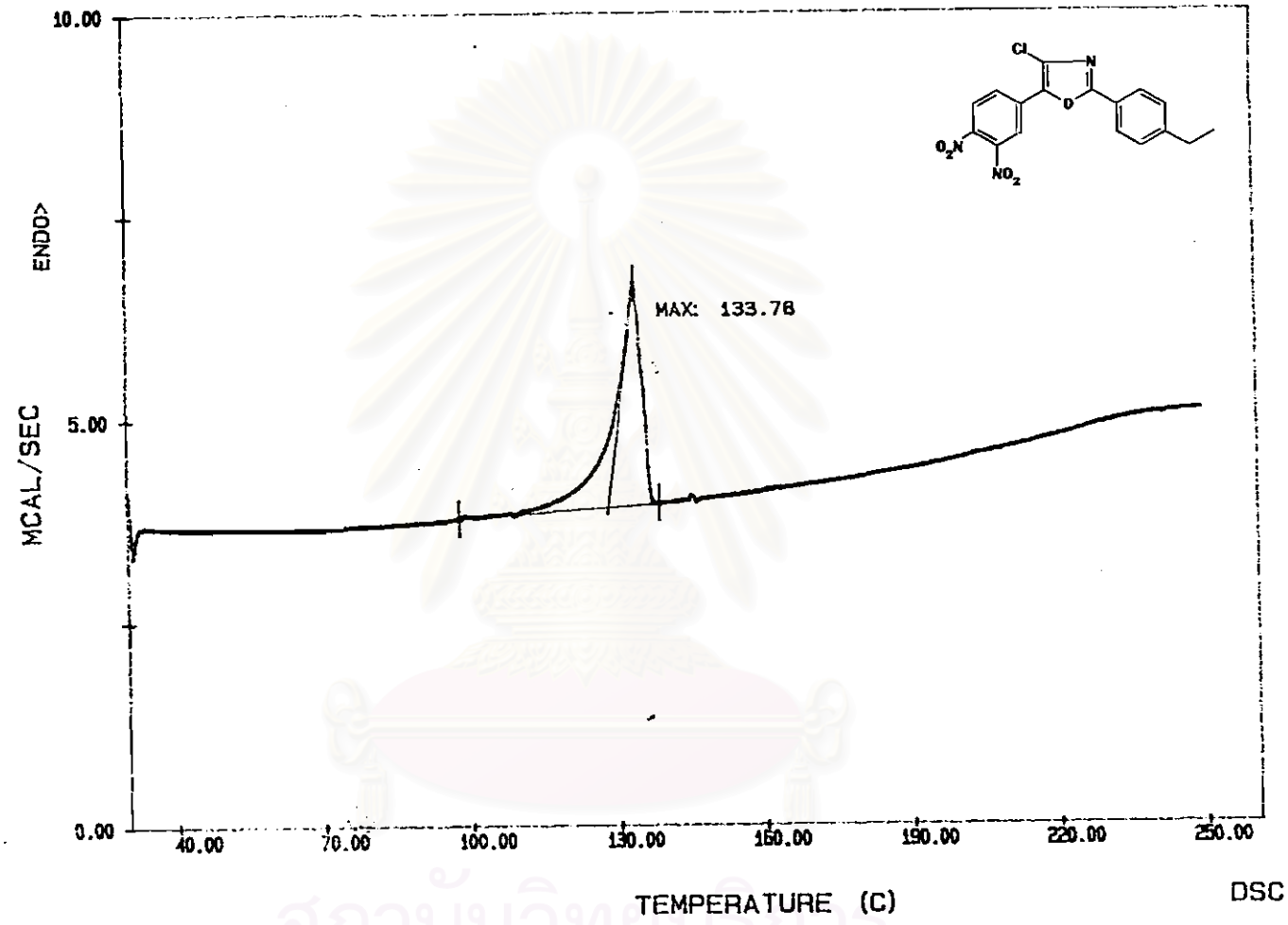

Figure A6. Melting Temperature of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-ethylphenyl)oxazole measured by DSC technique.

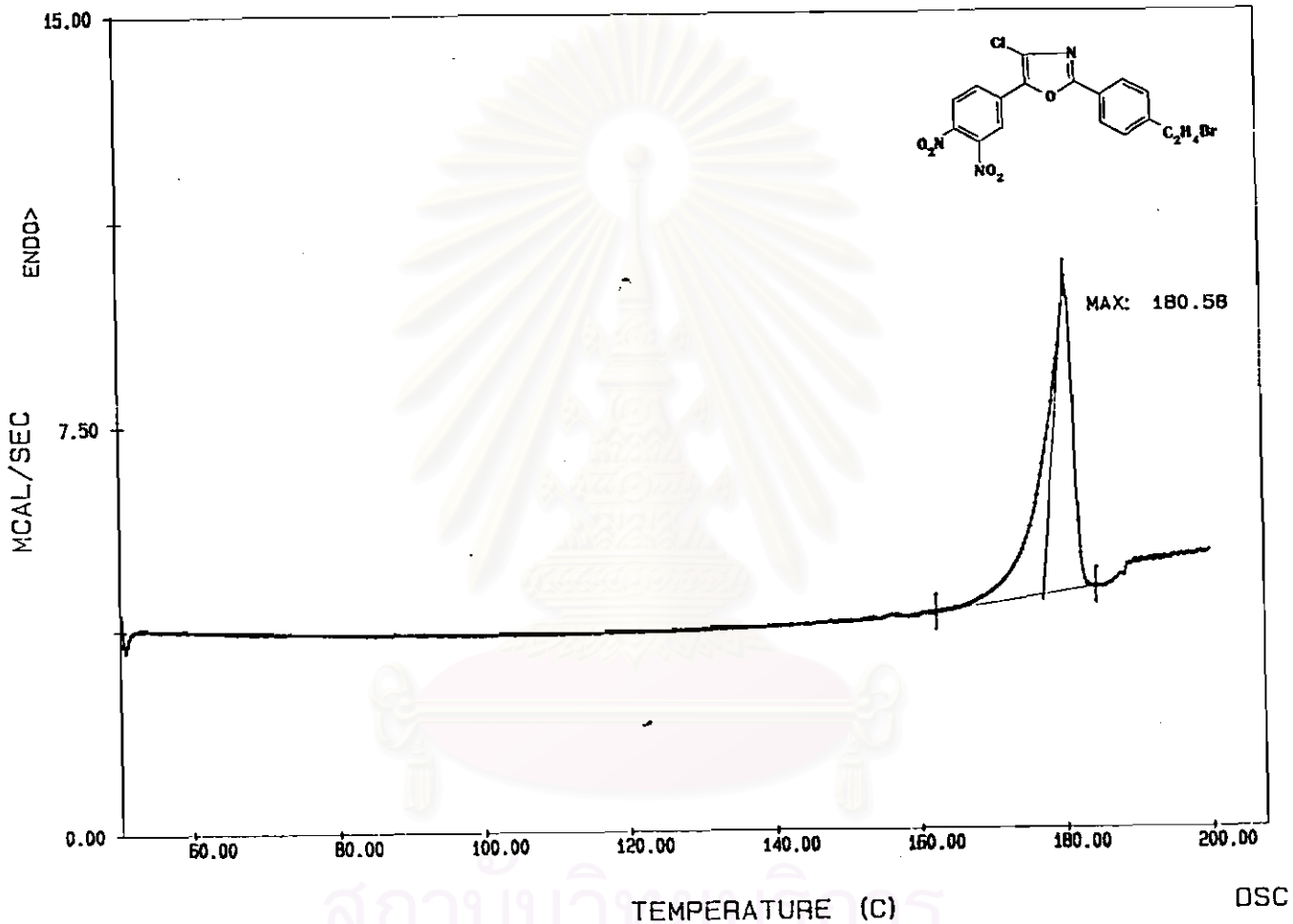

Figure A7. Melting Temperature of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-bromoethylphenyl)oxazole measured by DSC technique.

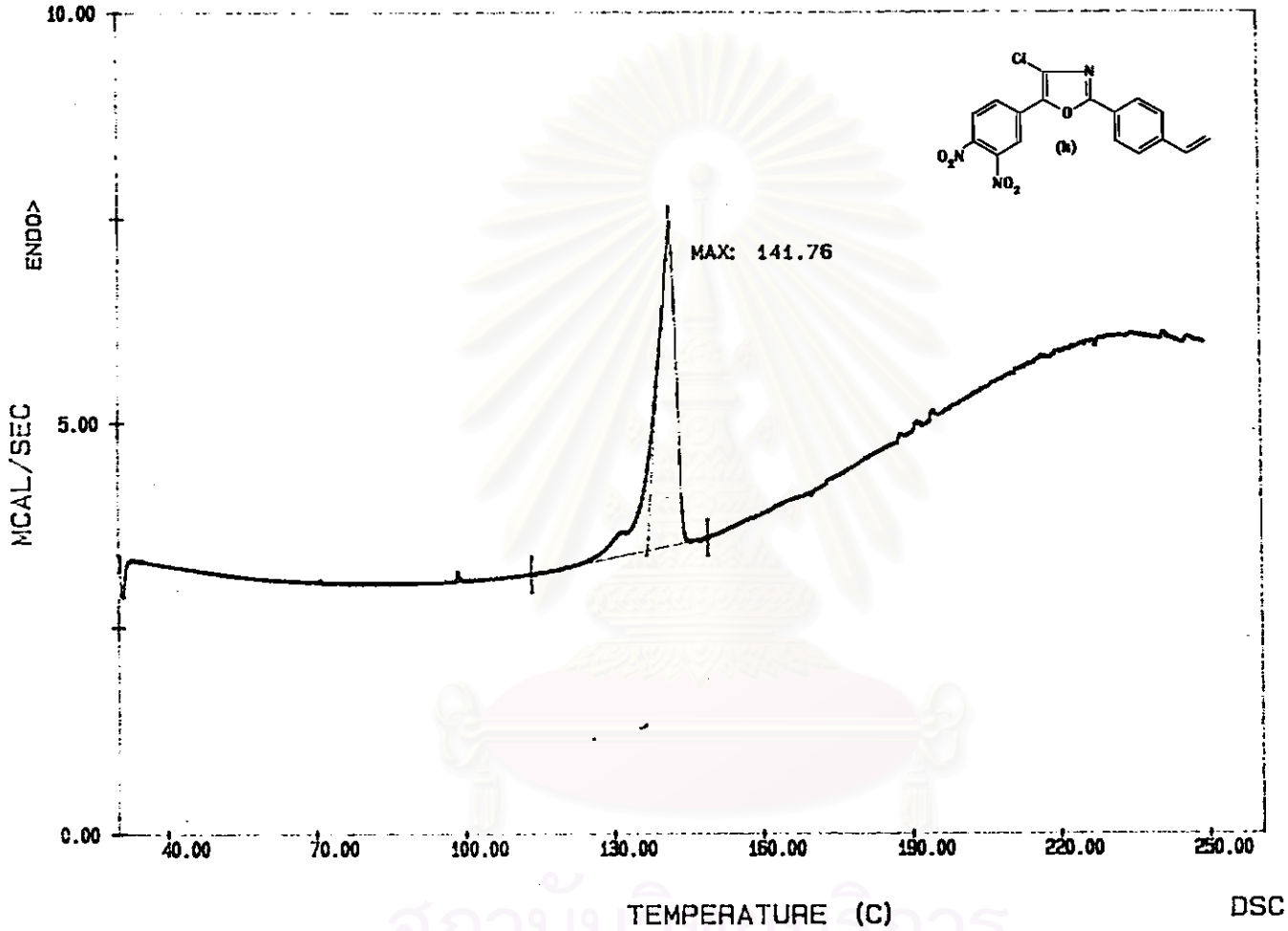

Figure A8. Melting Temperature of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-vinylphenyl)oxazole measured by DSC technique.

Appendix B

FTIR Spectra of compounds (1) - (10)

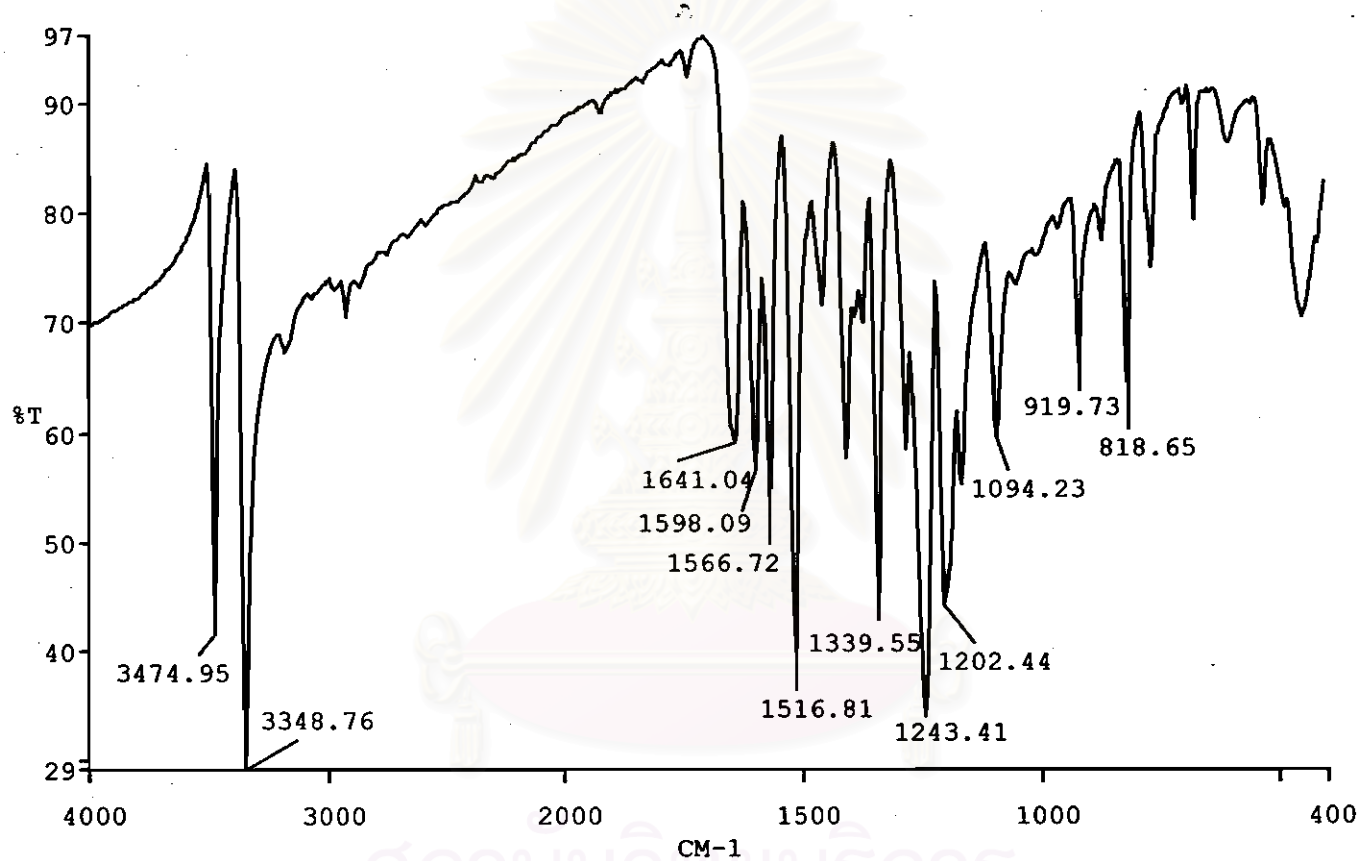

Figure B1 IR spectrum of 3-nitro-4-toluidine; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

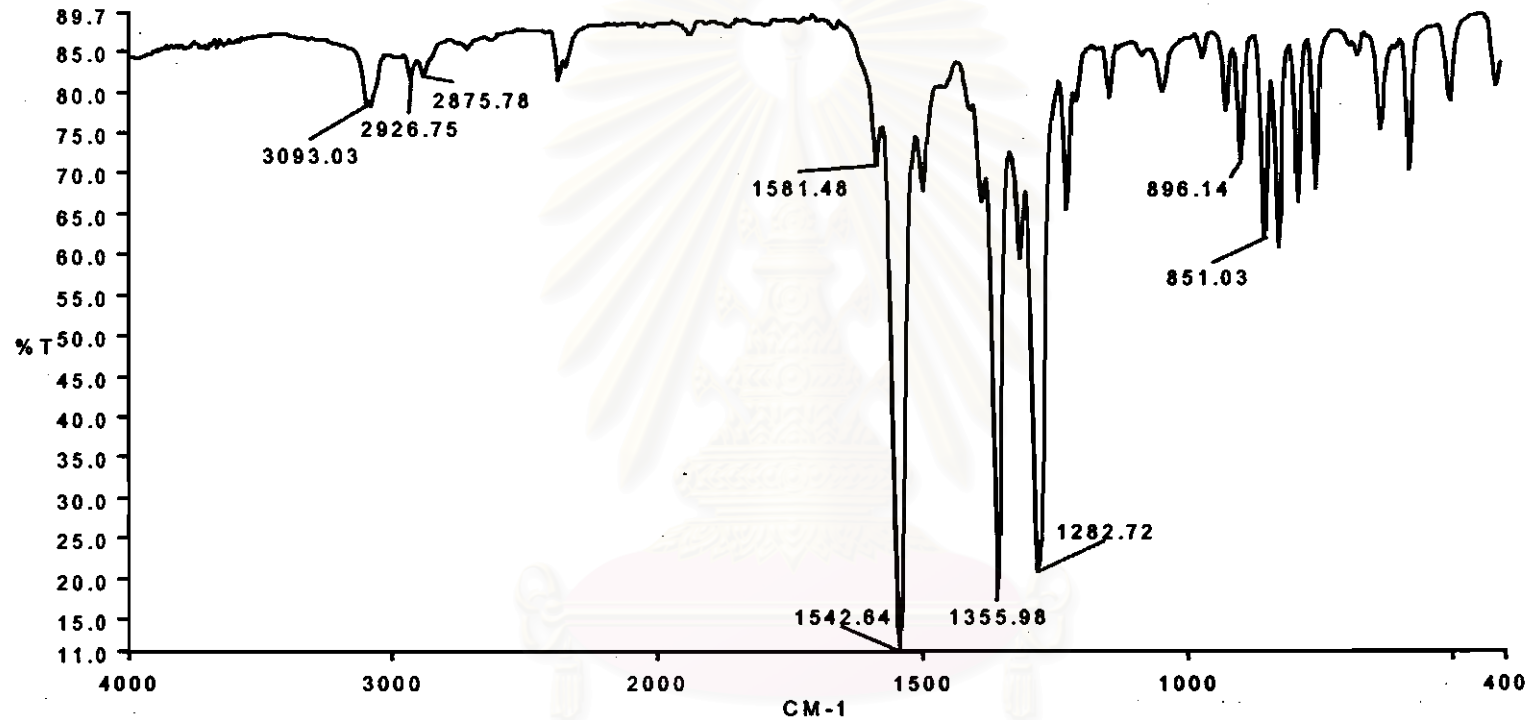

Figure B2 IR spectrum of 3-nitro-4-nitrosotoluene; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

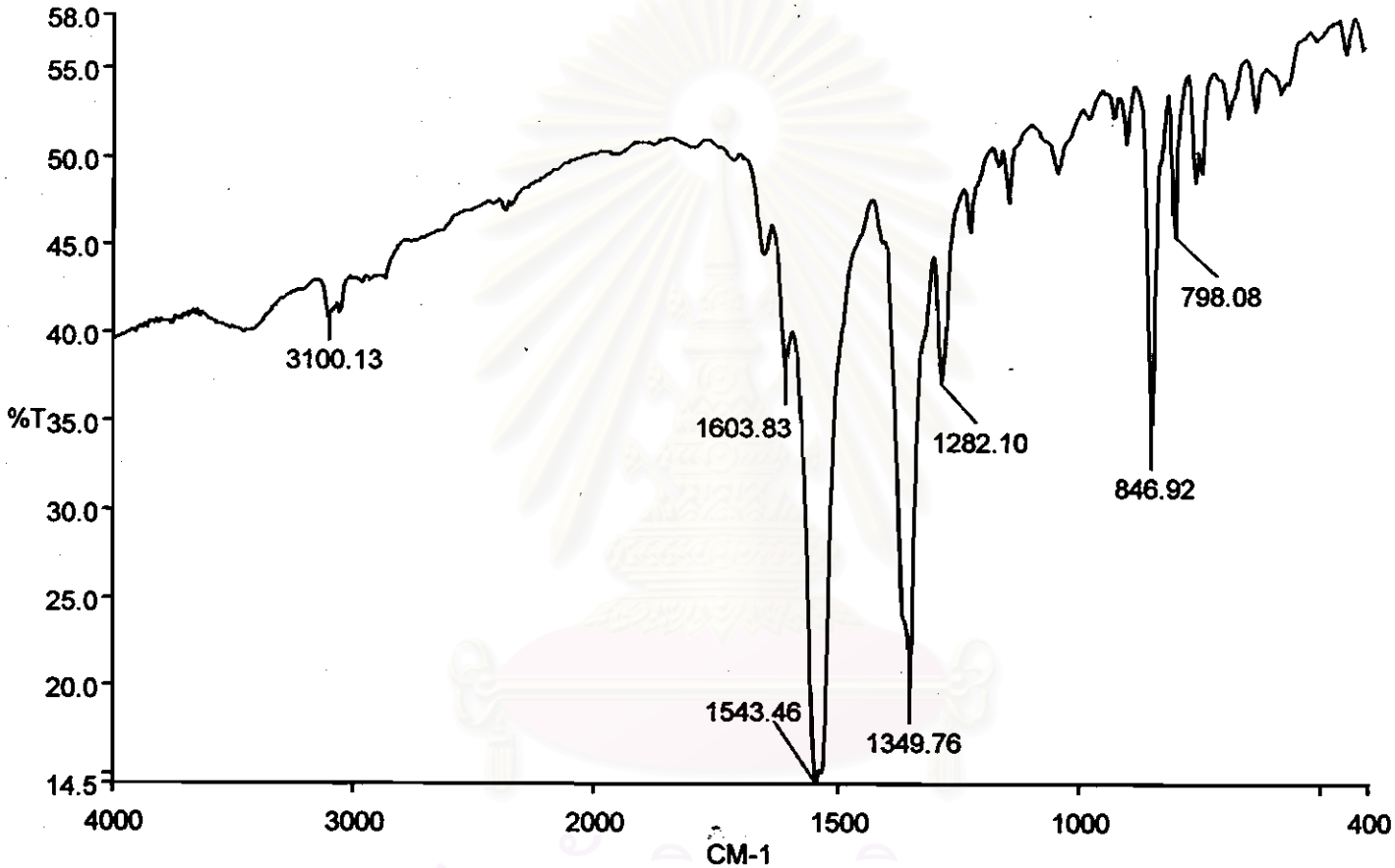

Figure B3 IR spectrum of 3,4-dinitrotoluene; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

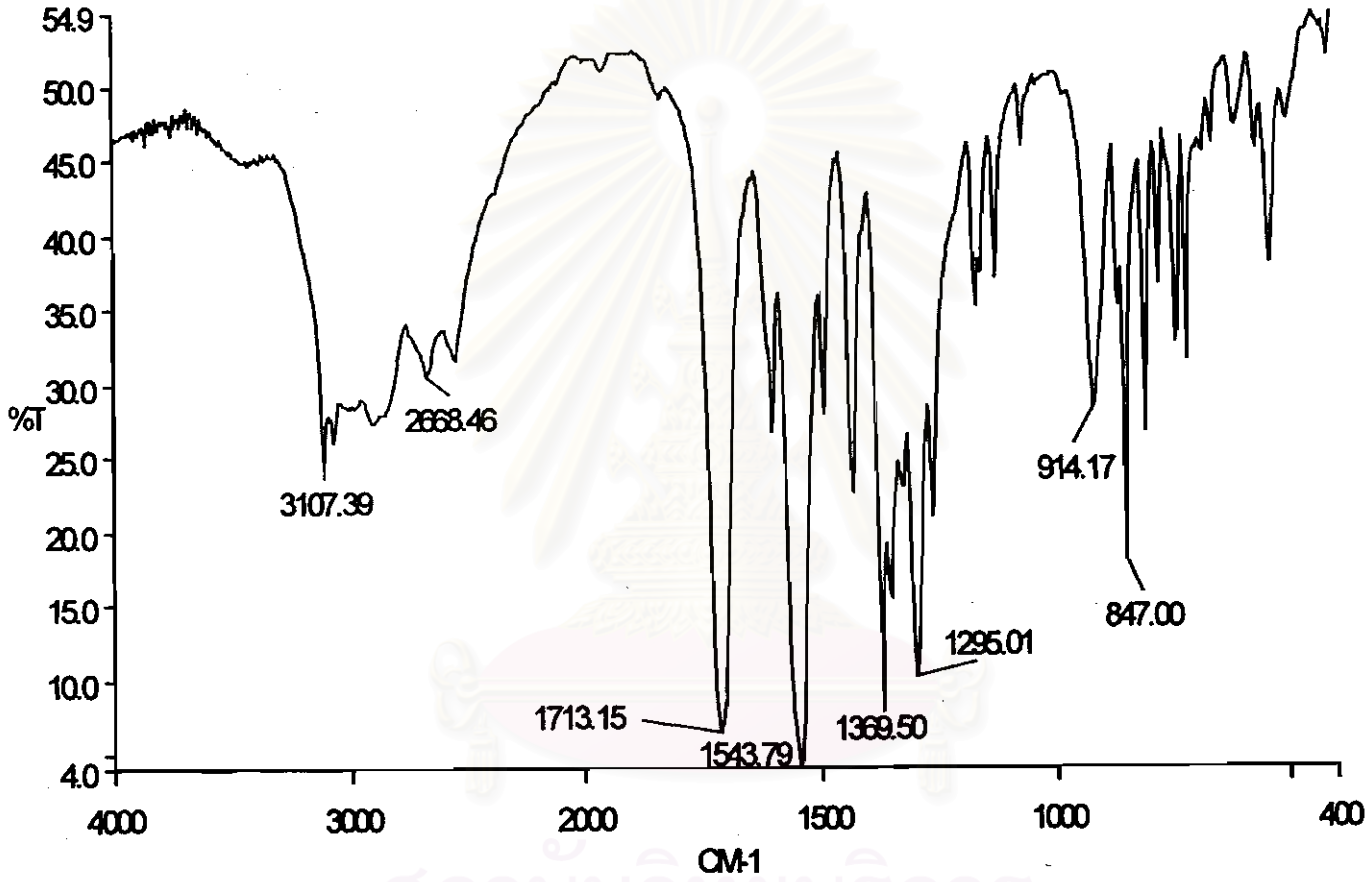

Figure B4 IR spectrum of 3,4-dinitrobenzoic acid; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

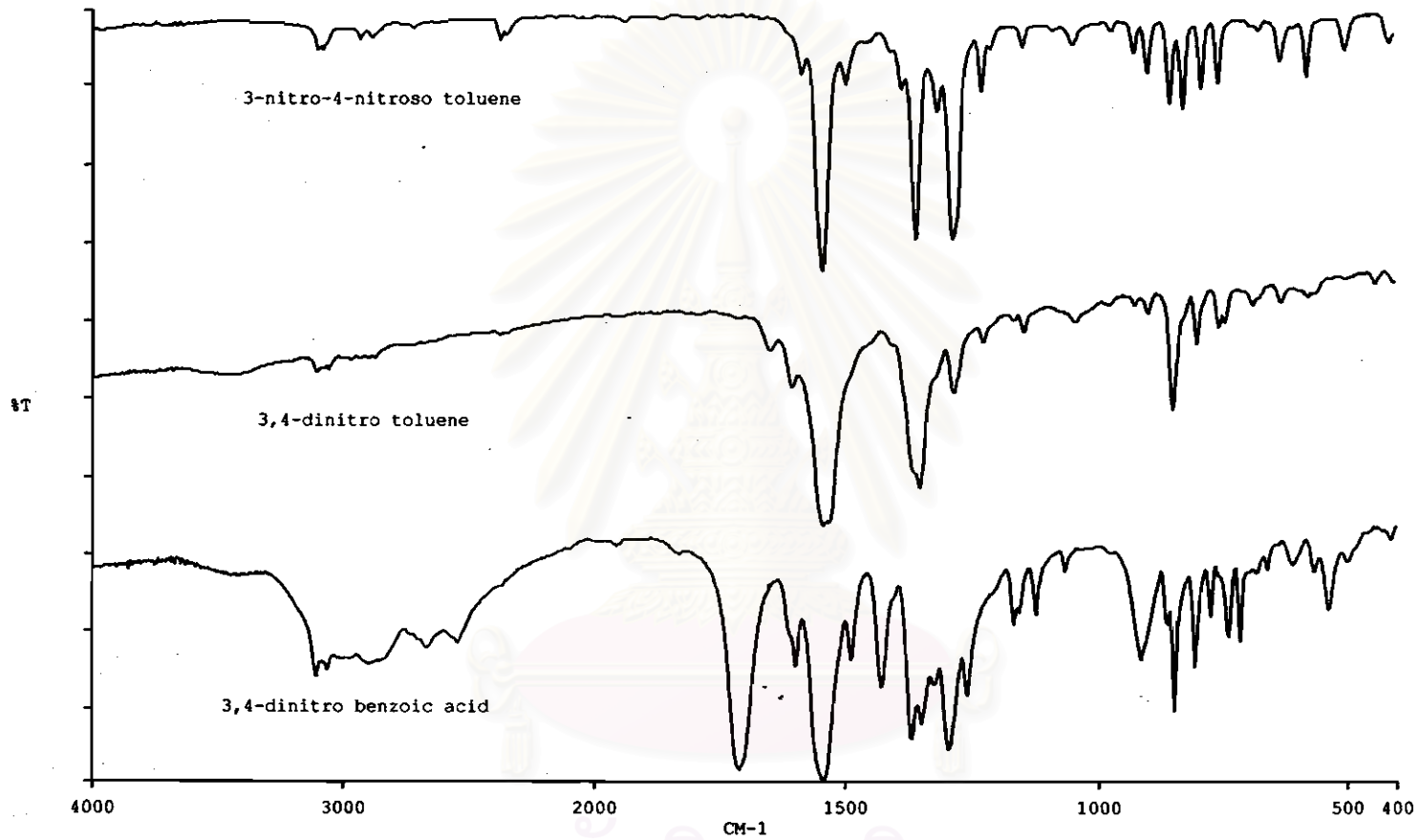

Figure B5 Comparison of 3-nitro-4-nitrosotoluene, 3,4-dinitrotoluene and 3,4-dinitrobenzoic acid

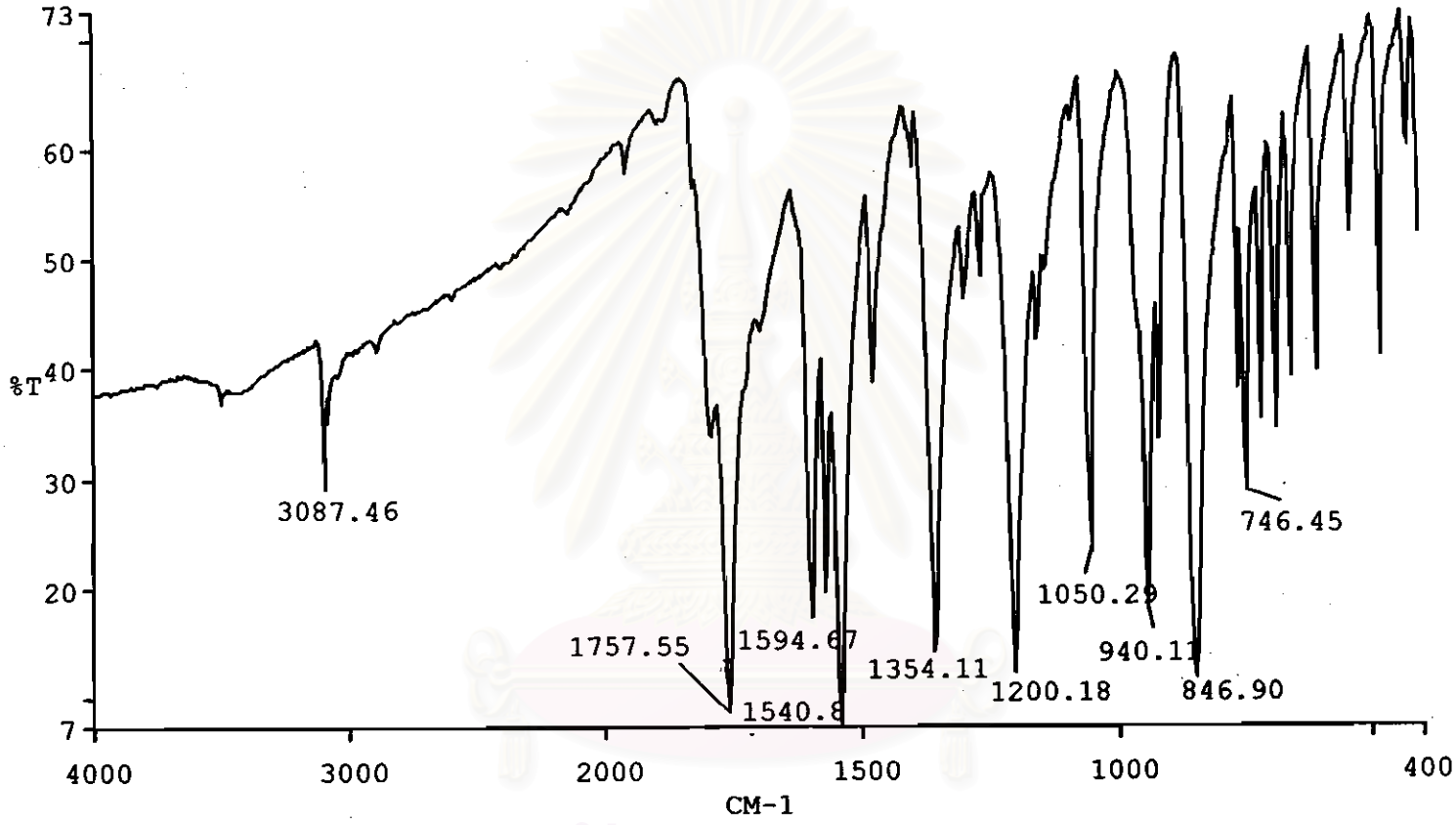

Figure B6 IR spectrum of 3,4-dinitrobenzoyl chloride; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

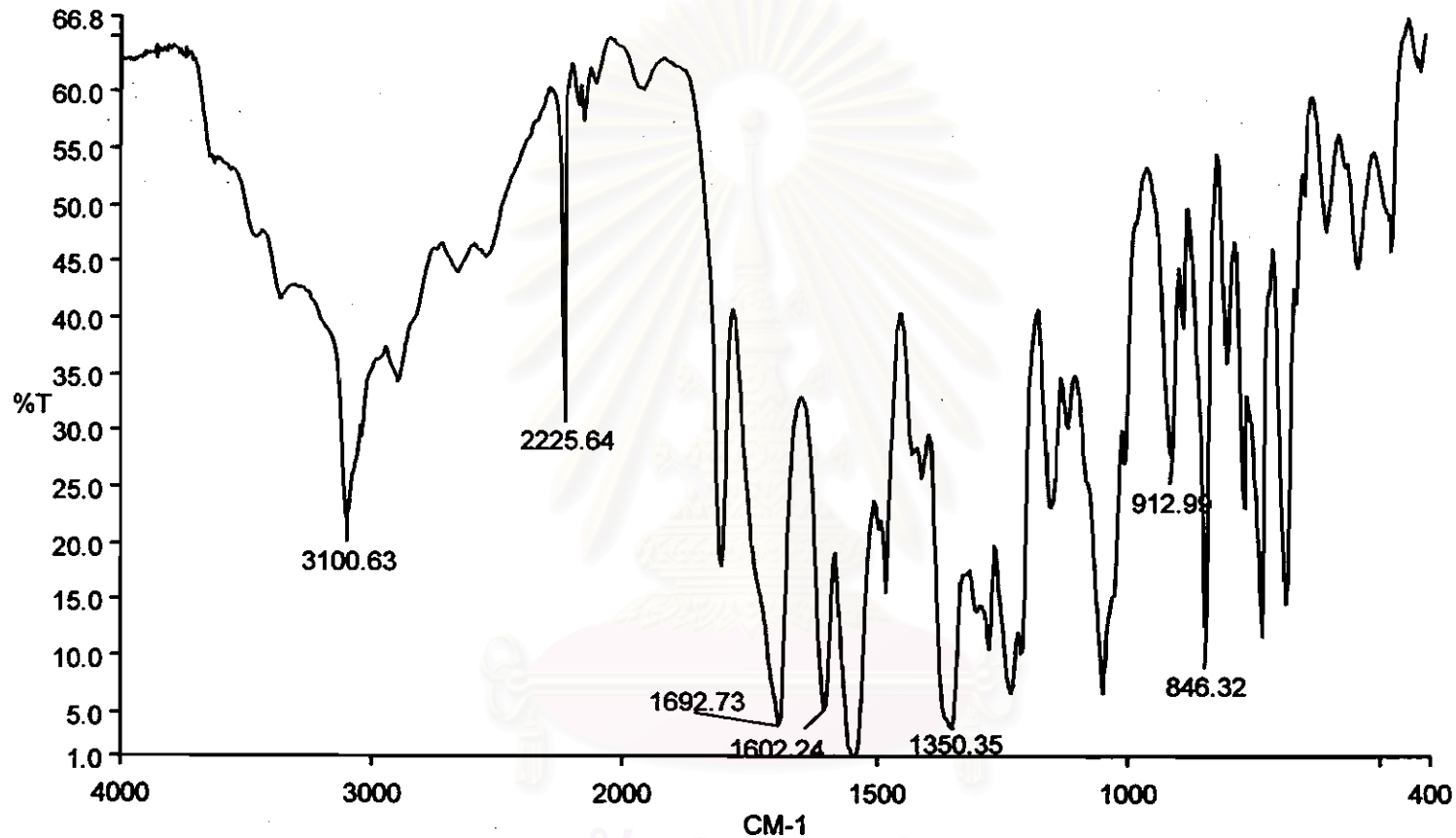

Figure B7 IR spectrum of 3,4-dinitrobenzoyl cyanide; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

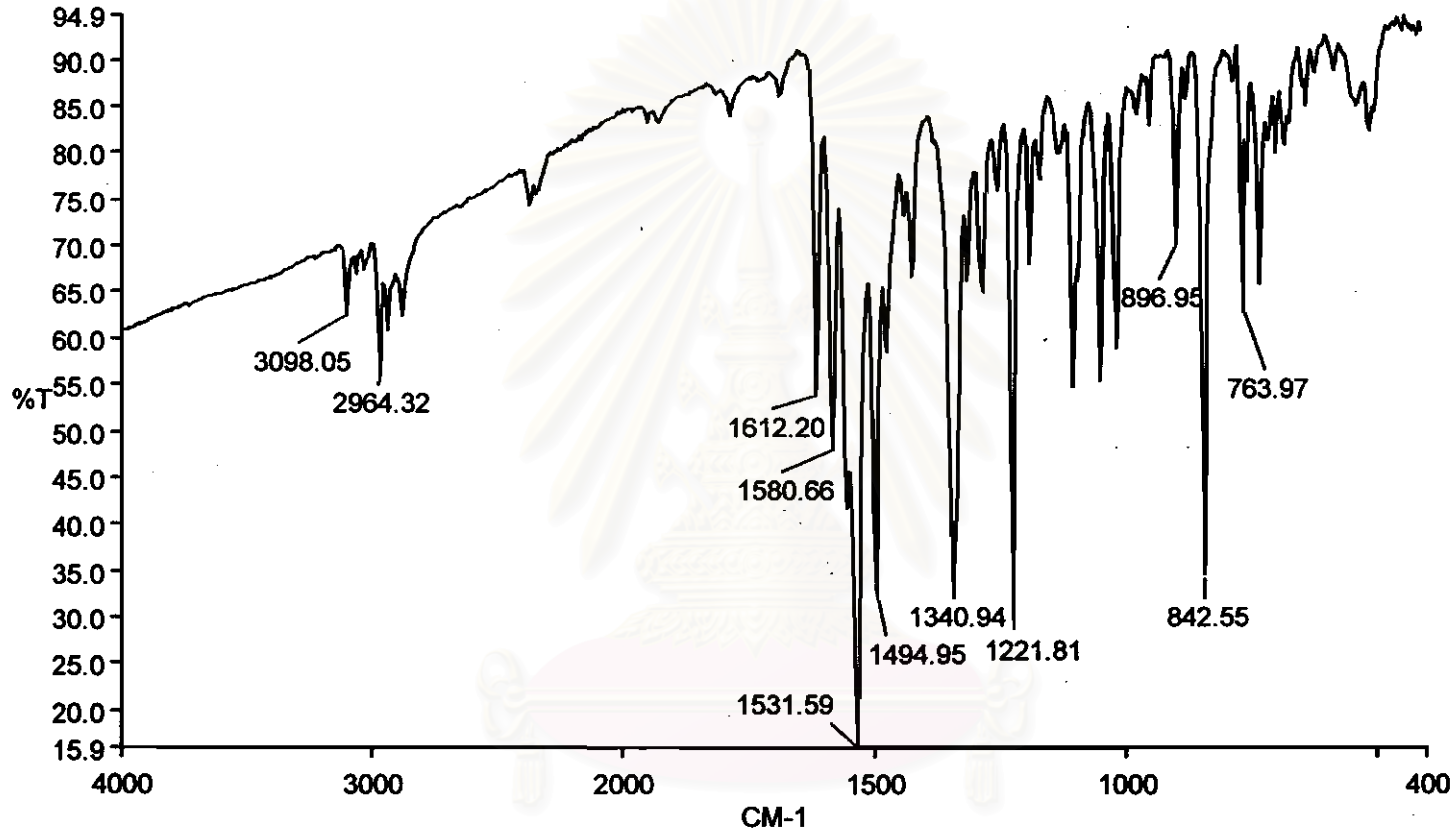

Figure B8 IR spectrum of 4-chloro-5-(3′,4′-dinitrophenyl)-2-(4-ethylphenyl)oxazole; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

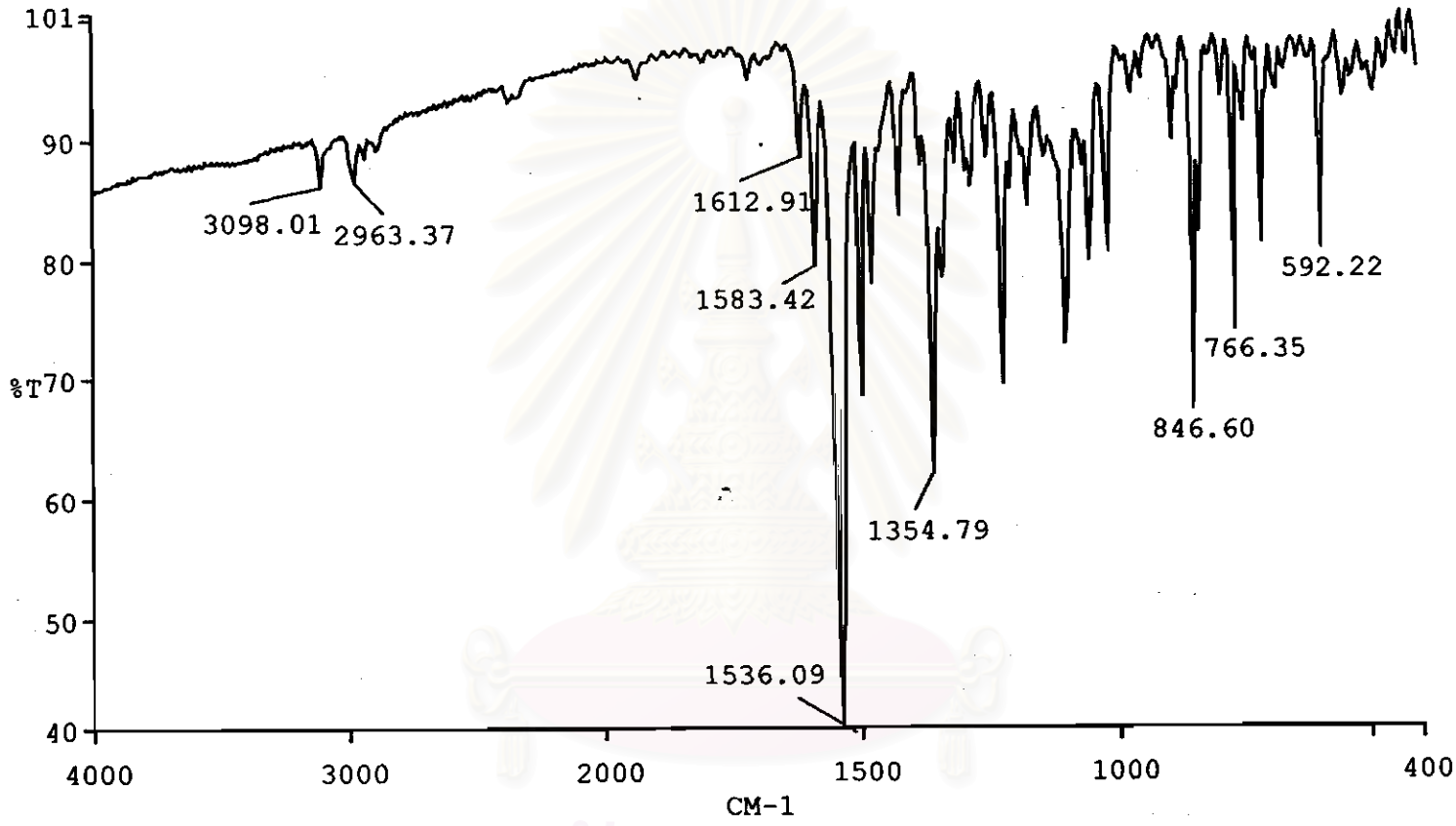

Figure B9 IR spectrum of 4-chloro-5-(3′,4′-dinitrophenyl)-2-(4-bromoethylphenyl)oxazole; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

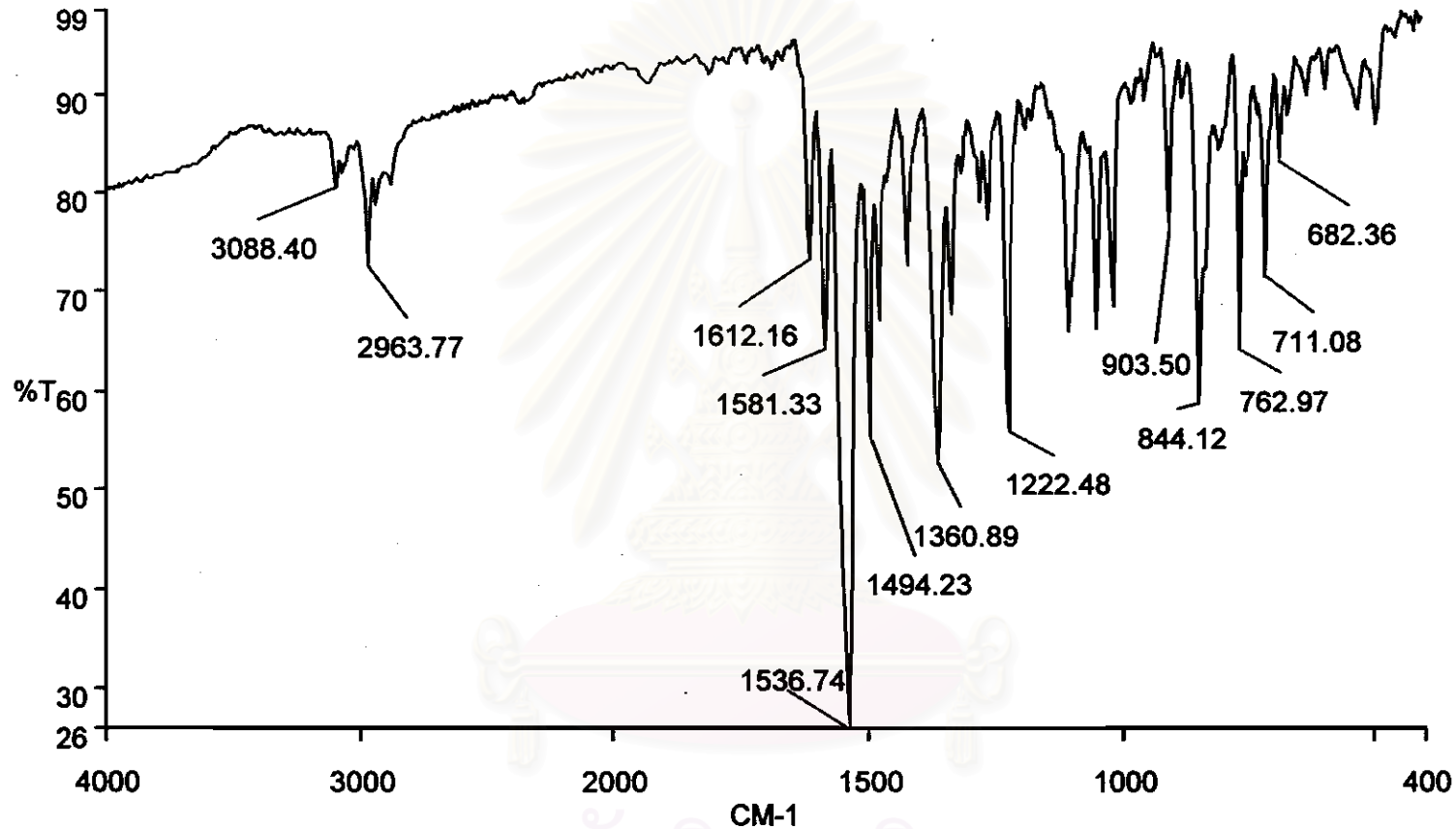

Figure B10 IR spectrum of 4-chloro-5-(3′,4′-dinitrophenyl)-2-(4-vinylphenyl)oxazole; KBr disc. The wavenumber was from 4000 to 400 cm^{-1}, the number of scan was five with the resolution of $4cm^{-1}$.

Appendix C

^{1}H-NMR Spectra of compounds (1) - (10)

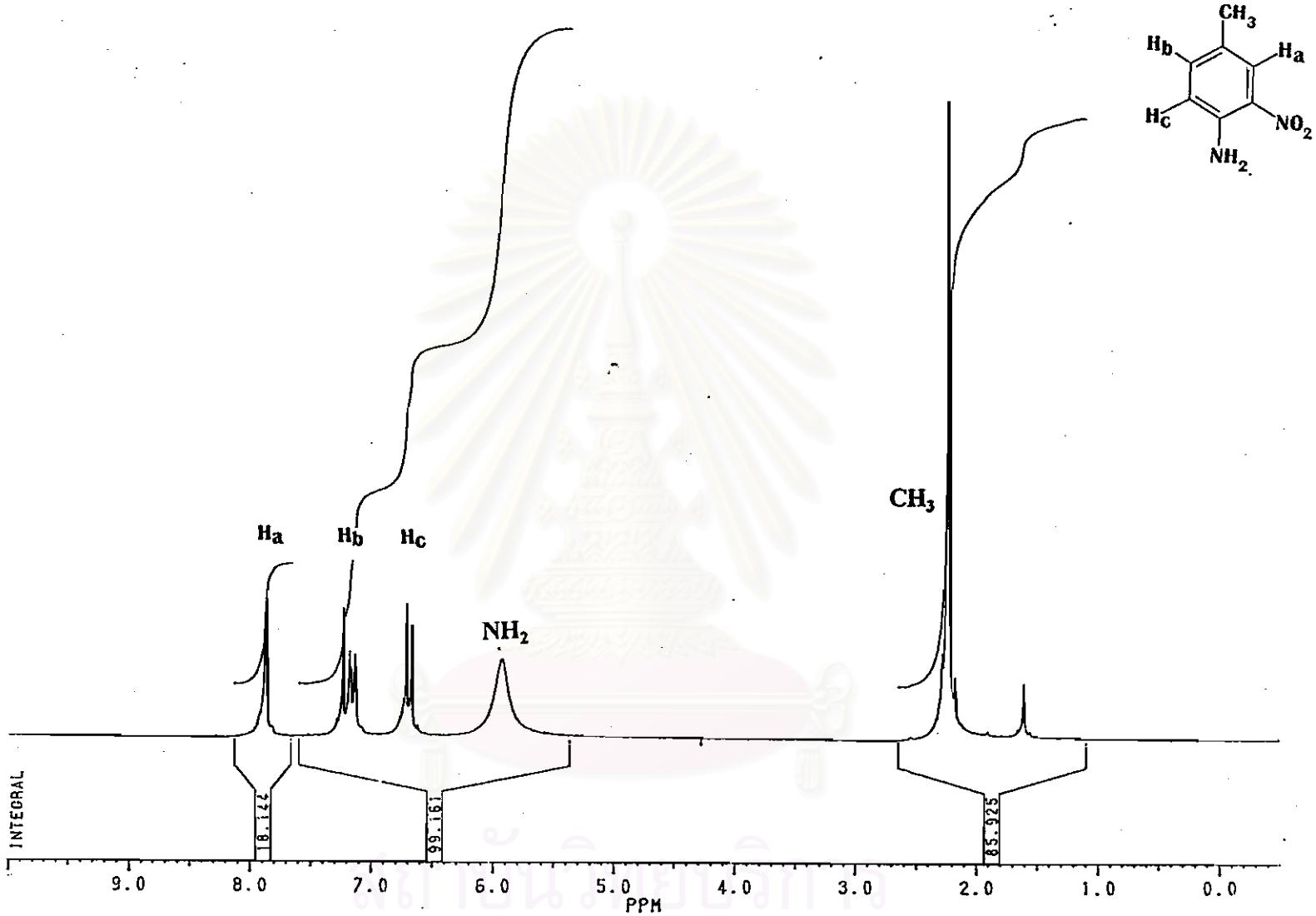

Figure C1. ^{1}H-NMR spectrum of 3-nitro-4-toluidine in $CDCl_3$, TMS internal marker.

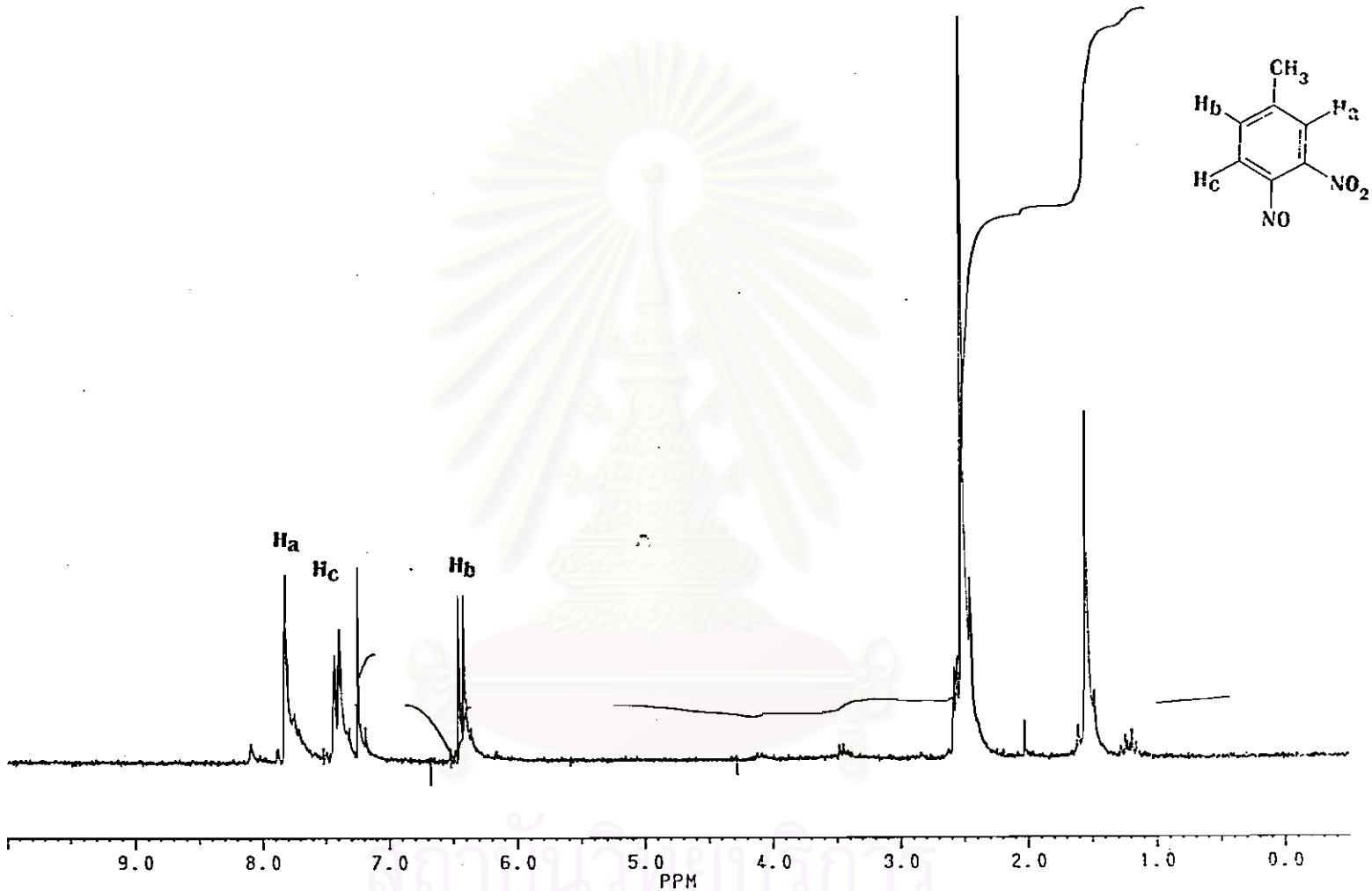

Figure C2. ^{1}H-NMR spectrum of 3-nitro-4-nitrosotoluene in $CDCl_3$, TMS internal marker.

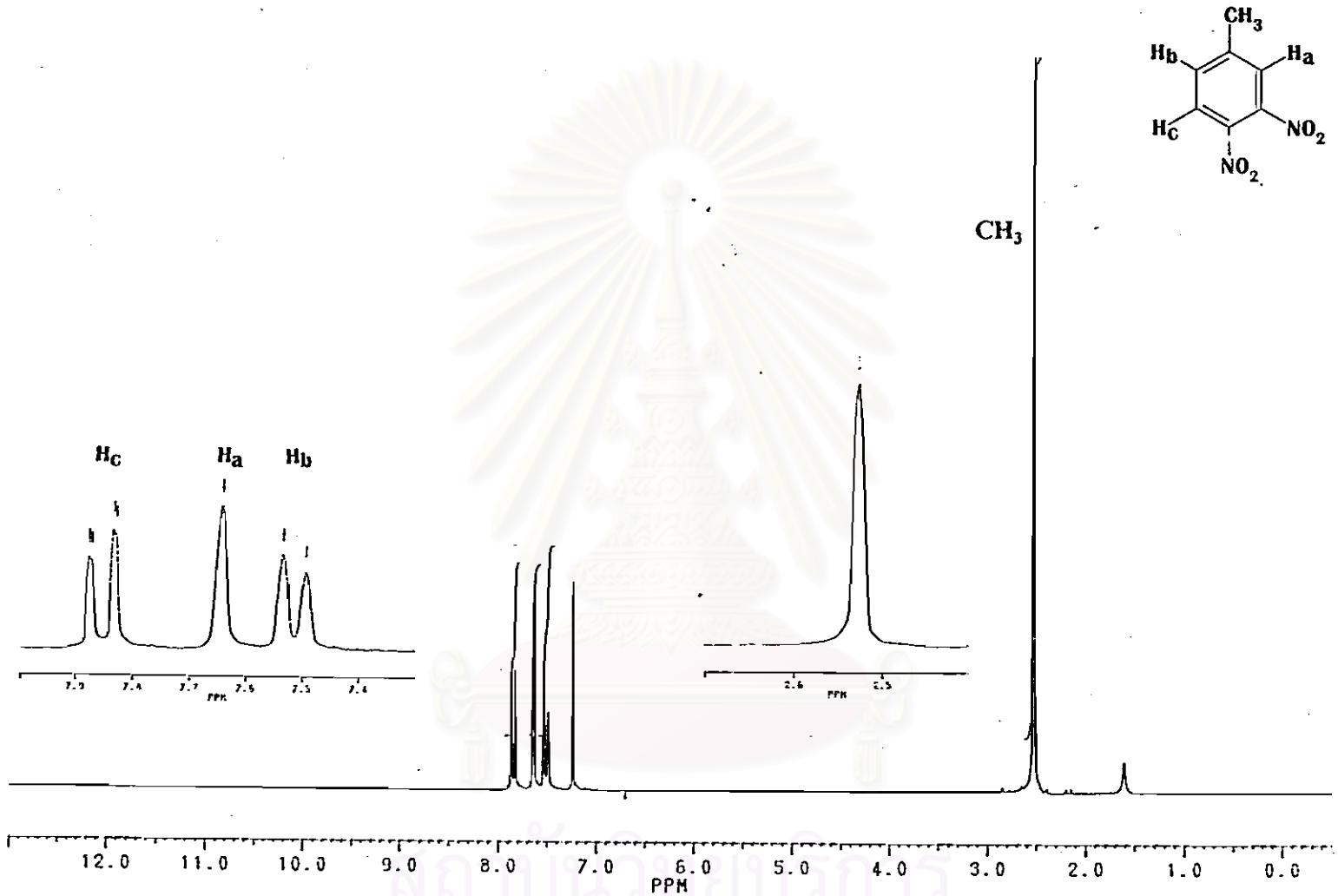

Figure C3. ^{1}H-NMR spectrum of 3,4-dinitrotoluene in $CDCl_3$, TMS internal marker.

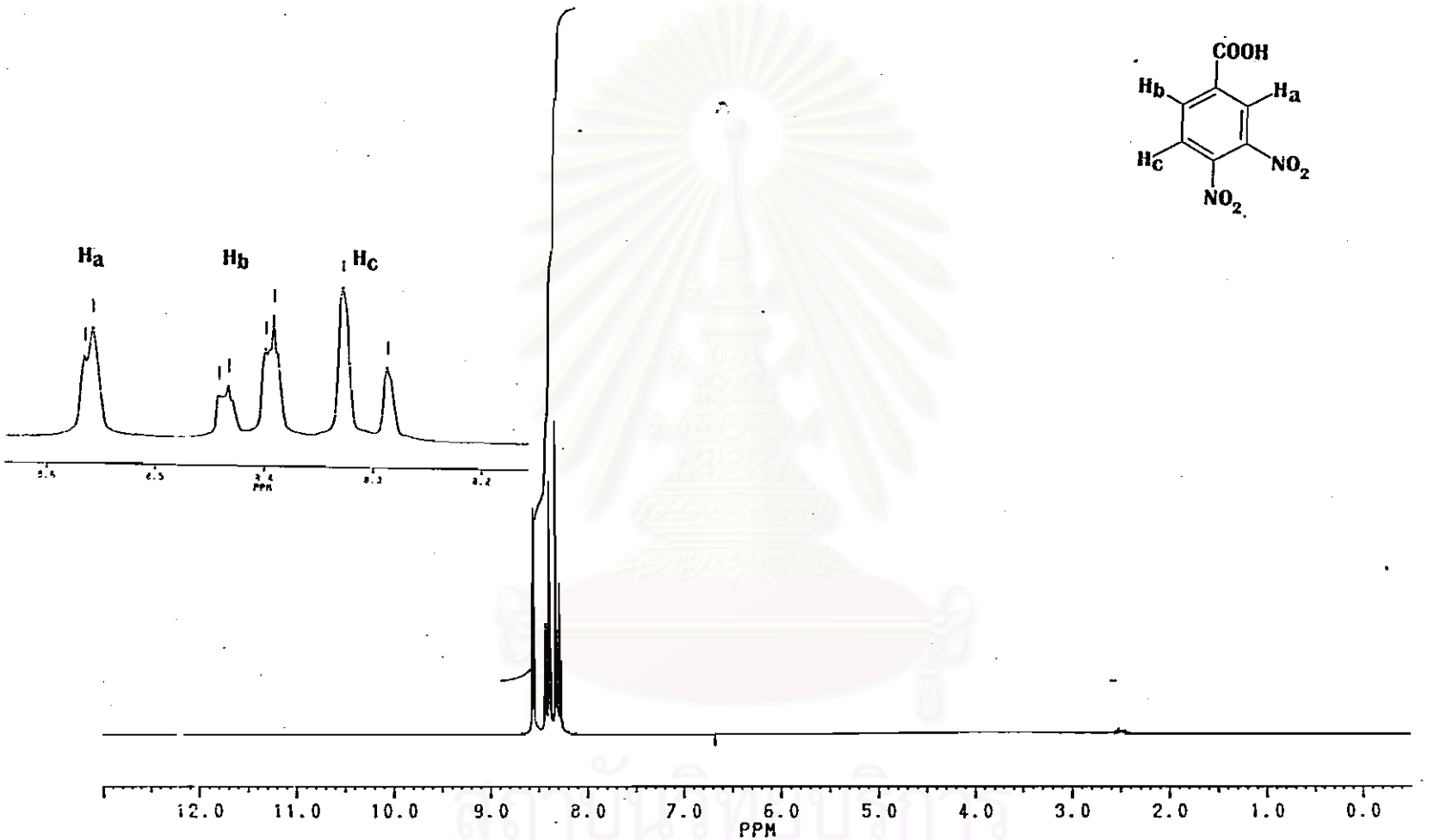

Figure C4. ^{1}H-NMR spectrum of 3,4-dinitrobenzoic acid in DMSO, TMS internal marker.

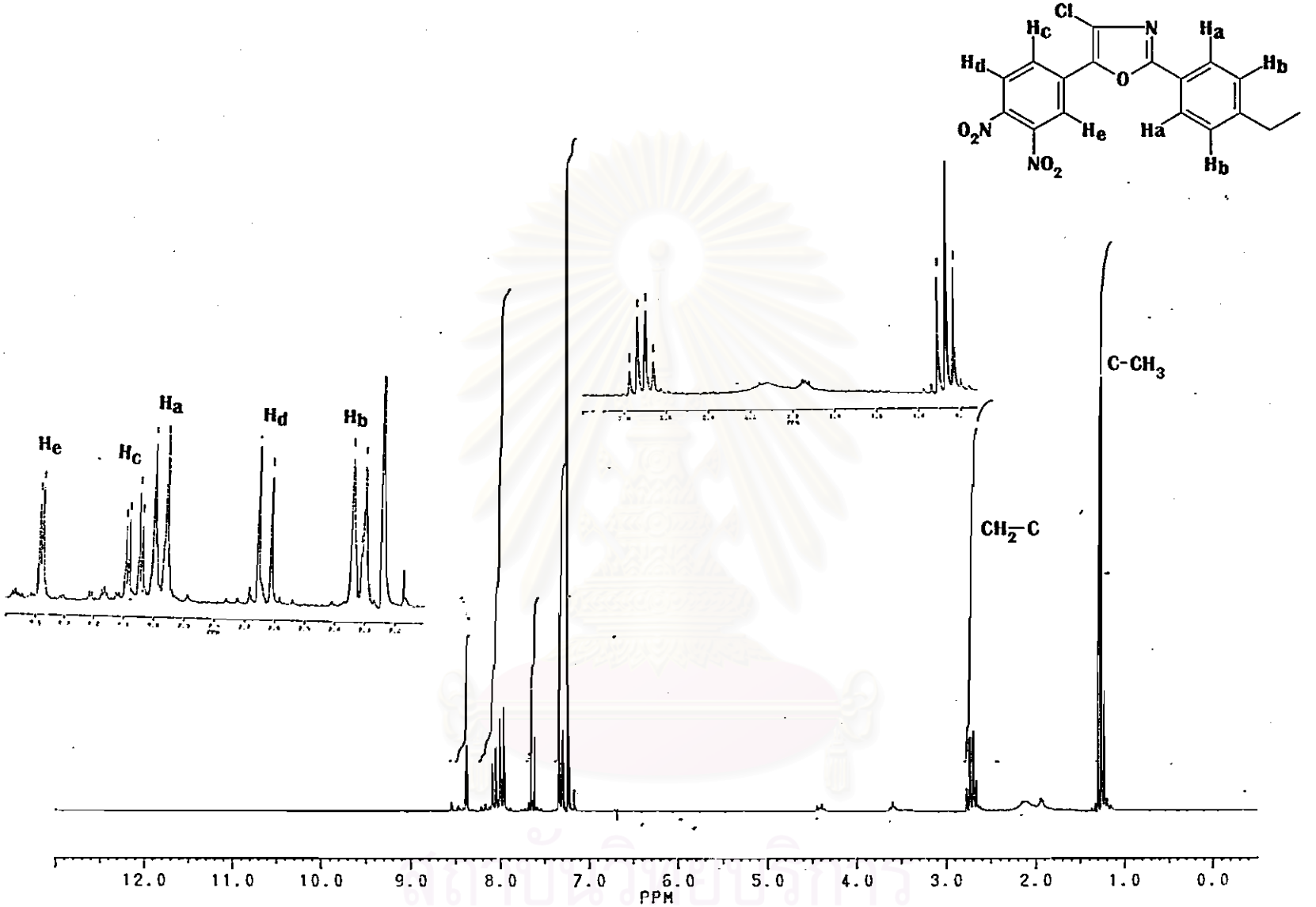

Figure C5. ^{1}H-NMR spectrum of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-ethylphenyl)oxazole in $CDCl_3$, TMS internal marker.

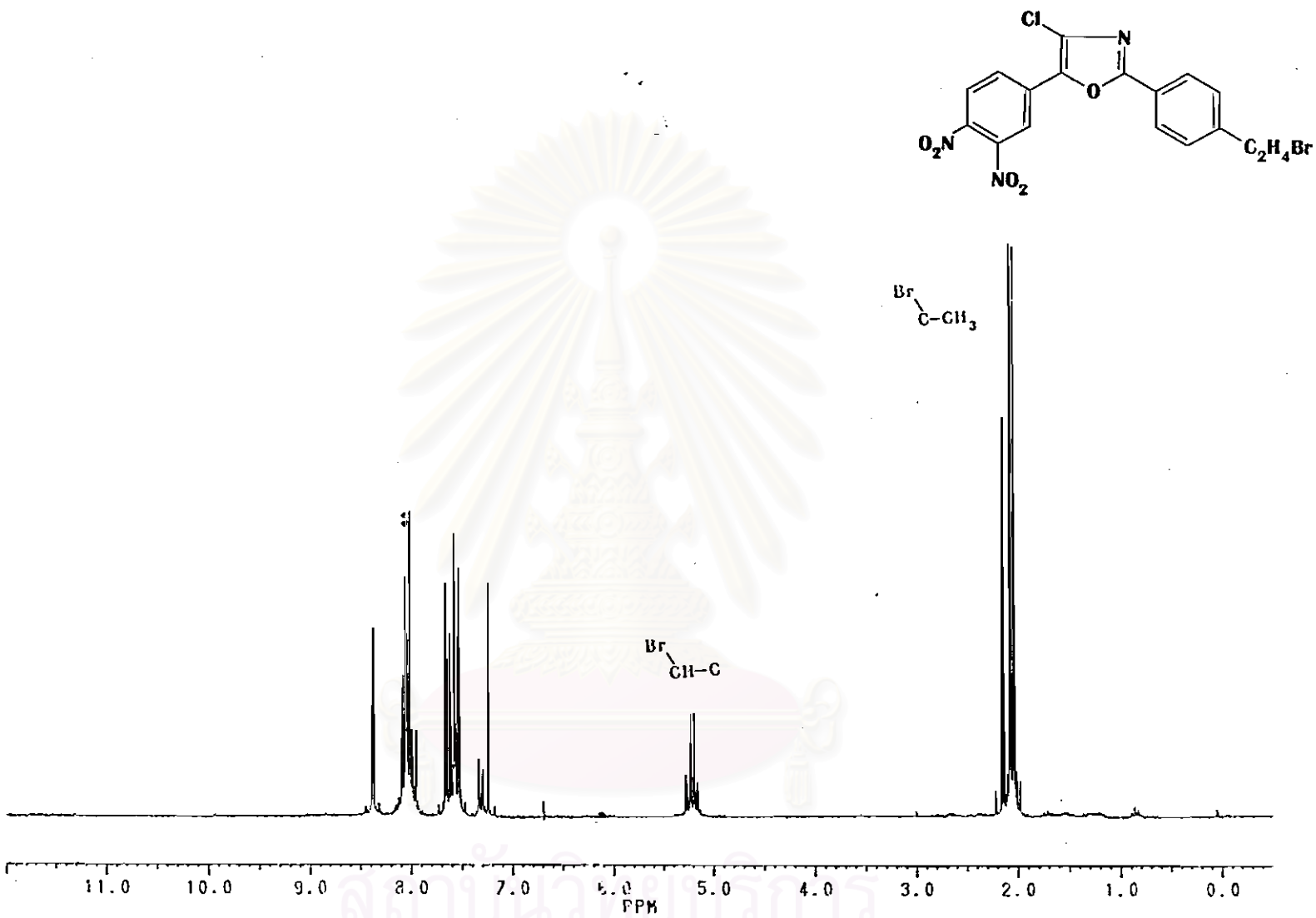

Figure C6. ^{1}H-NMR spectrum of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-bromoethylphenyl)oxazole in $CDCl_3$, TMS internal marker.

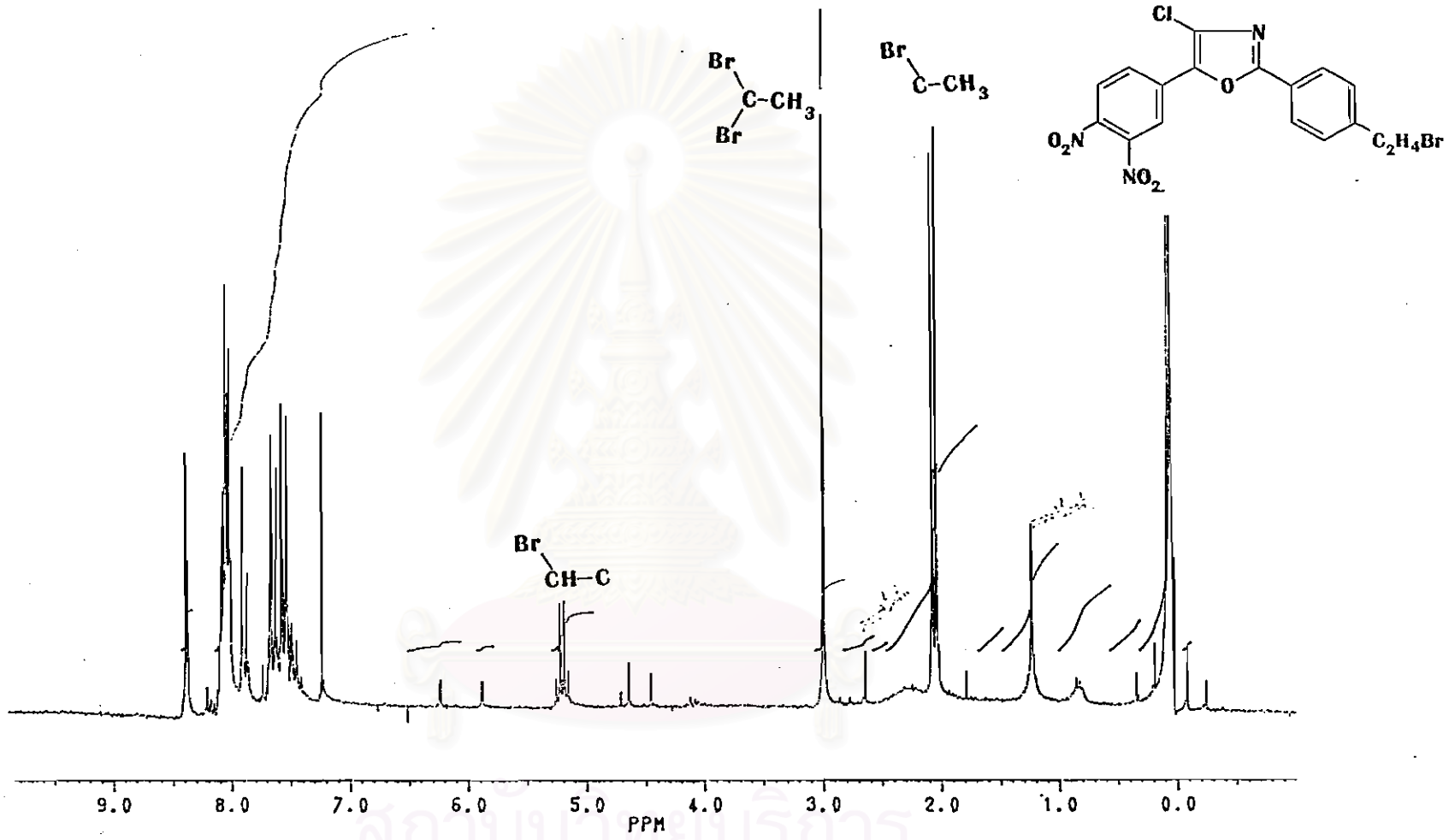

Figure C7. ^{1}H-NMR spectrum of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-bromoethylphenyl)oxazole in $CDCl_3$, TMS internal marker.

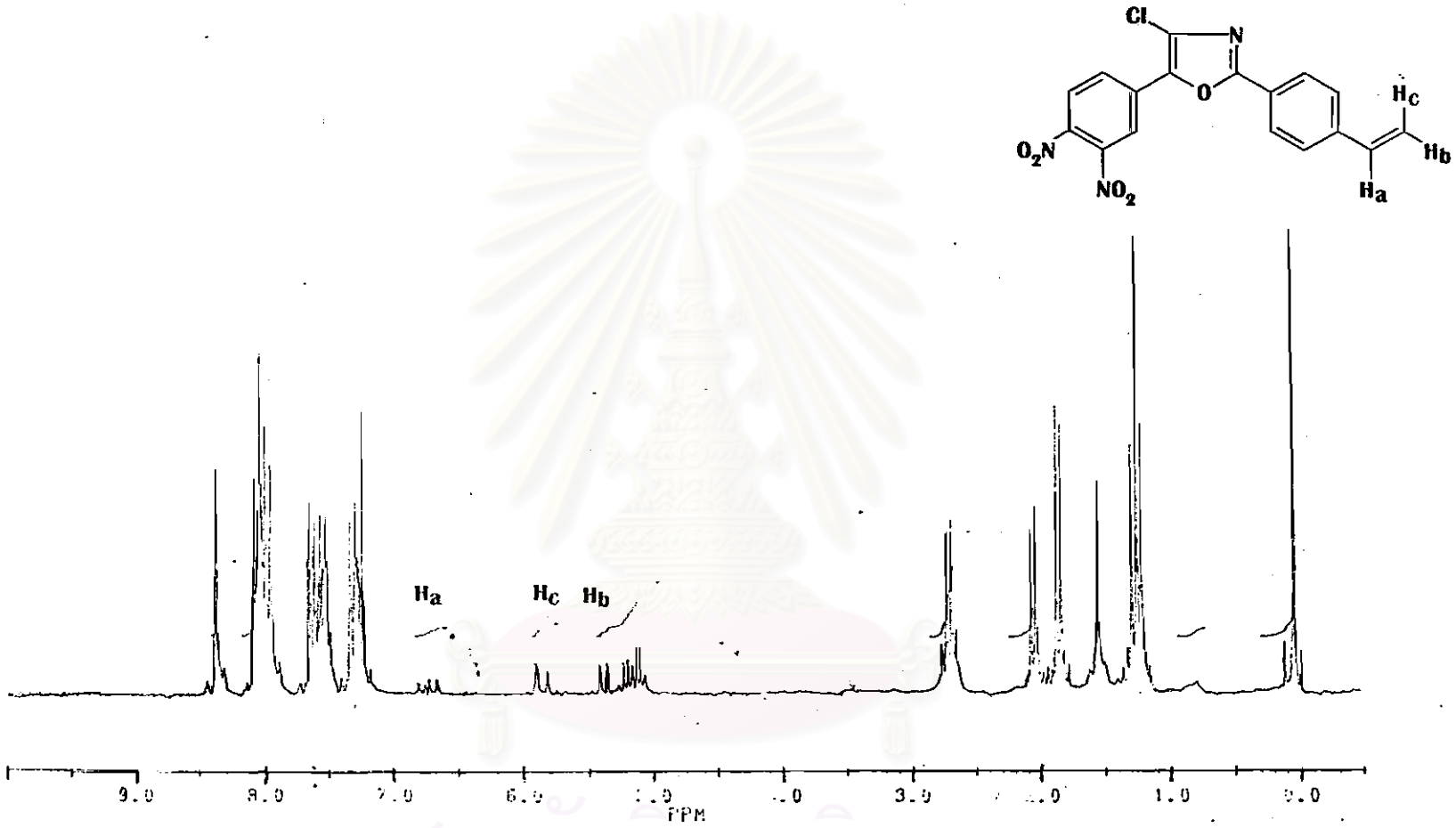

Figure C8. ^{1}H-NMR spectrum of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-vinylphenyl)oxazole in $CDCl_3$, TMS internal marker.

Appendix D

^{13}C-NMR Spectra of compounds (1) - (10)

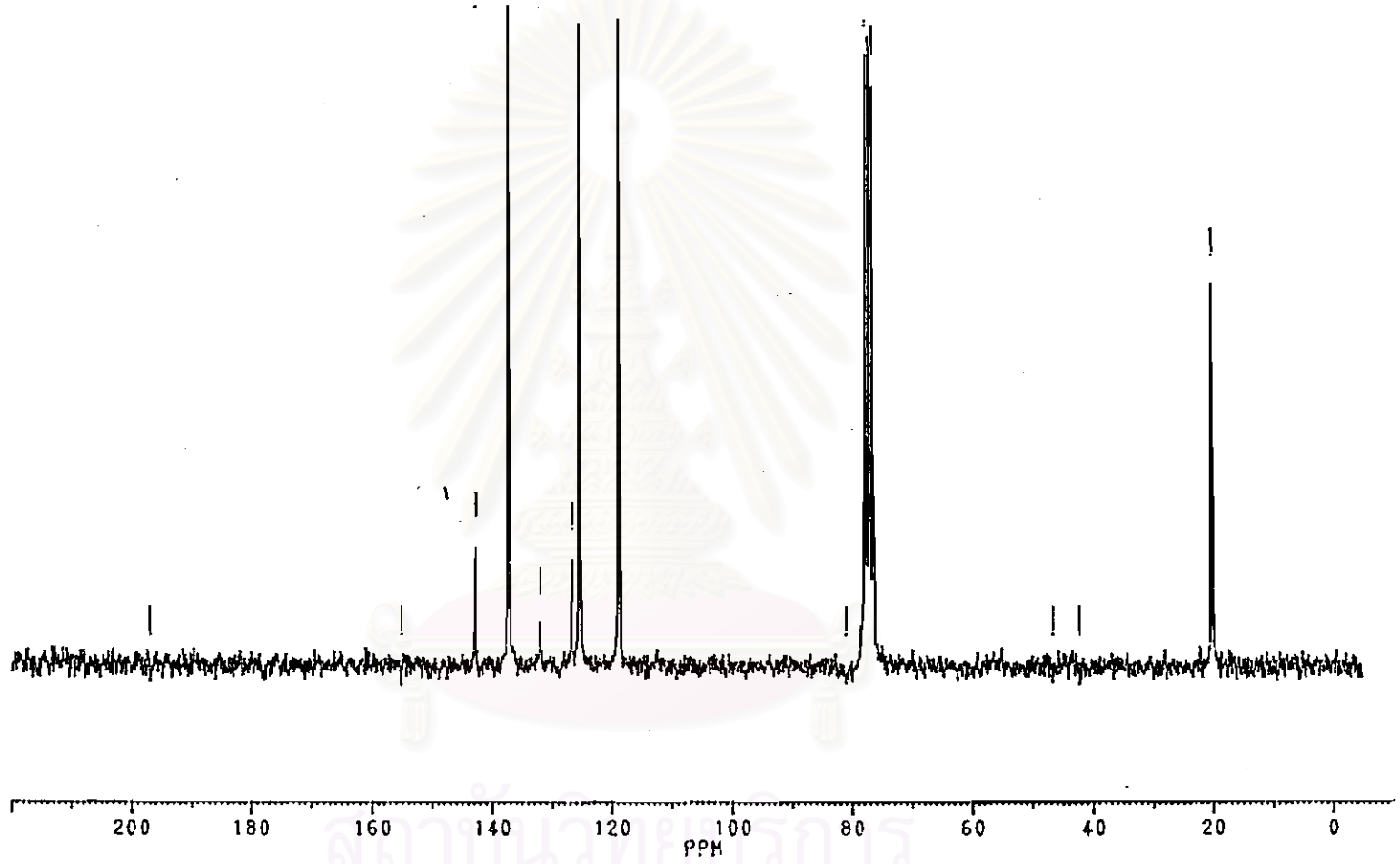

Figure D1. ^{13}C-NMR spectrum of 3-nitro-4-toluidine in $CDCl_3$, TMS internal marker.

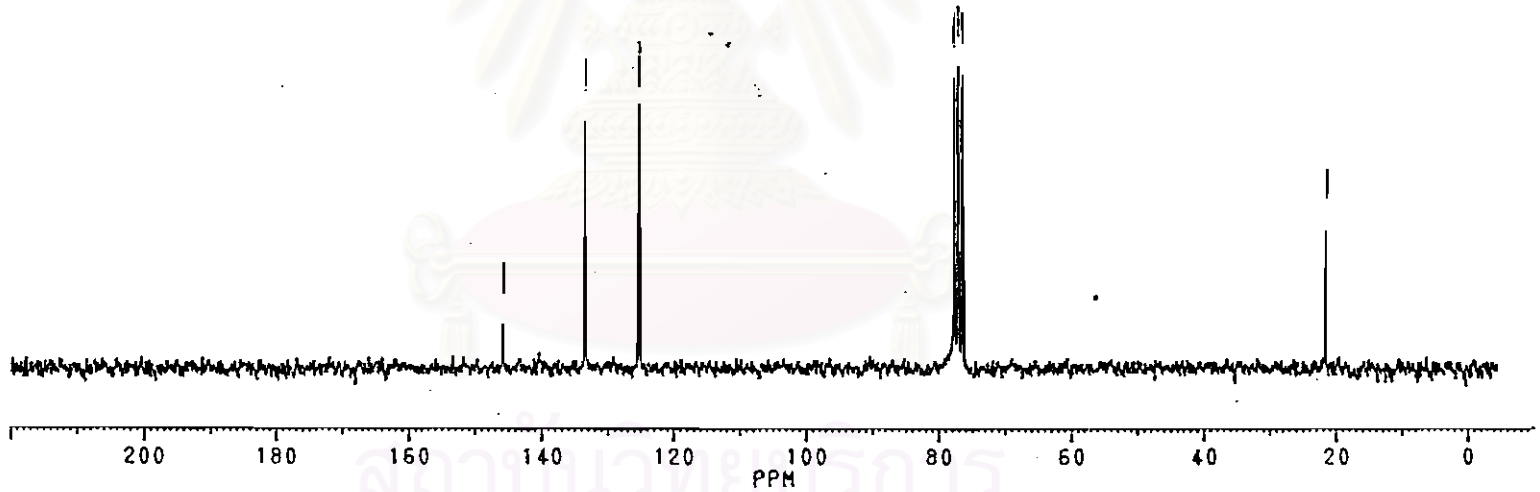

Figure D2. ^{13}C-NMR spectrum of 3,4-dinitrotoluene in $CDCl_3$, TMS internal marker.

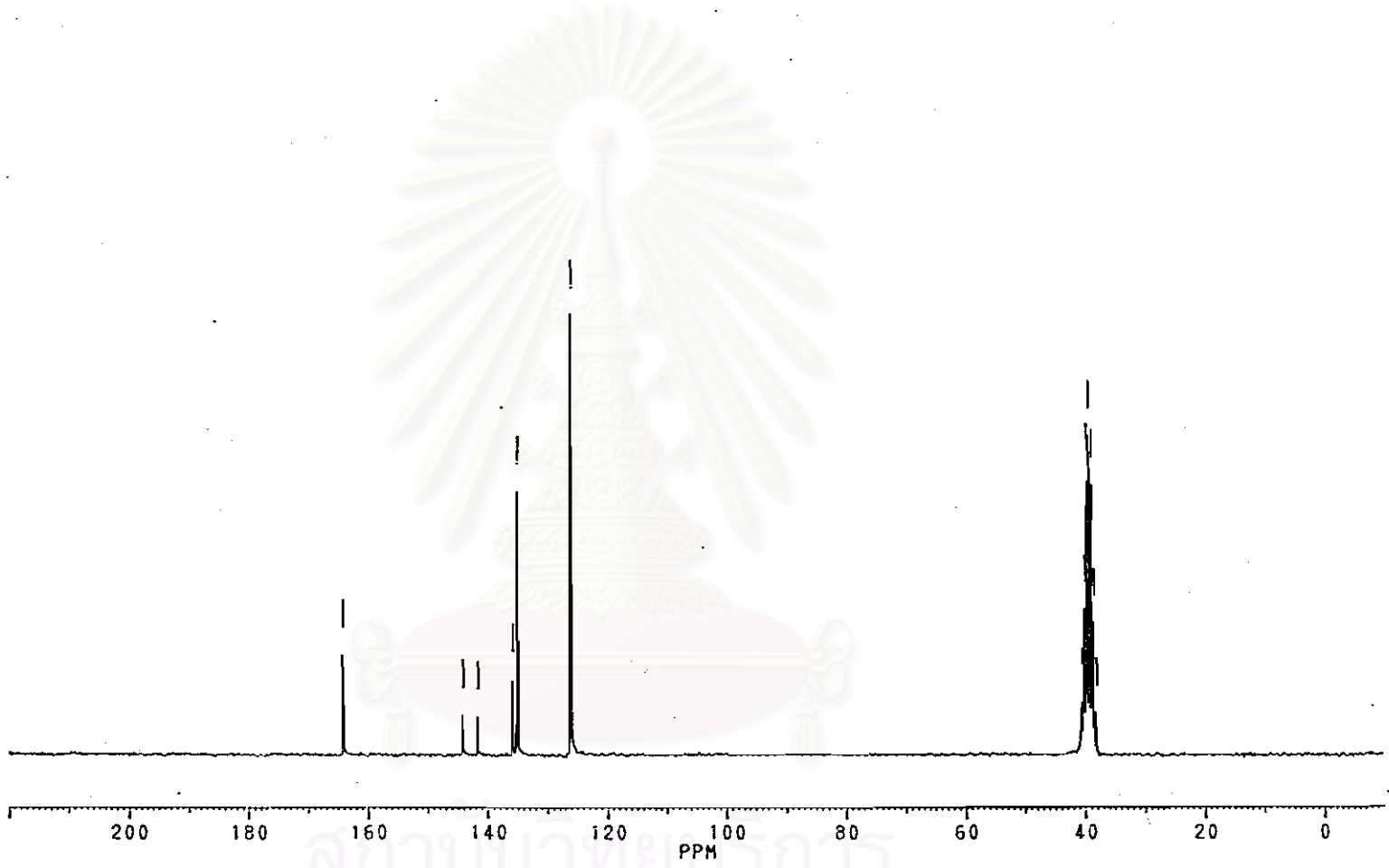

Figure D3. ^{13}C-NMR spectrum of 3,4-dinitrobenzoic acid in DMSO, TMS internal marker.

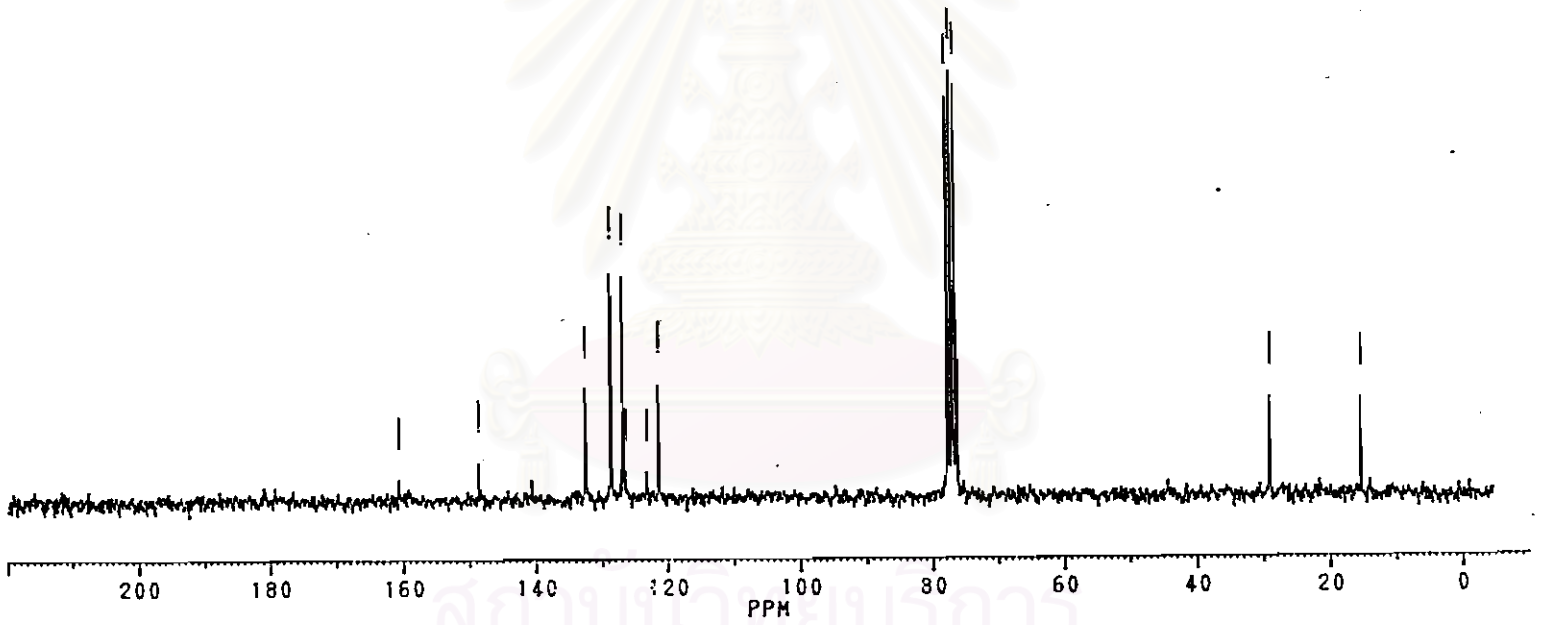

Figure D4. ^{13}C-NMR spectrum of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-ethylphenyl)oxazole in $CDCl_3$, TMS internal marker.

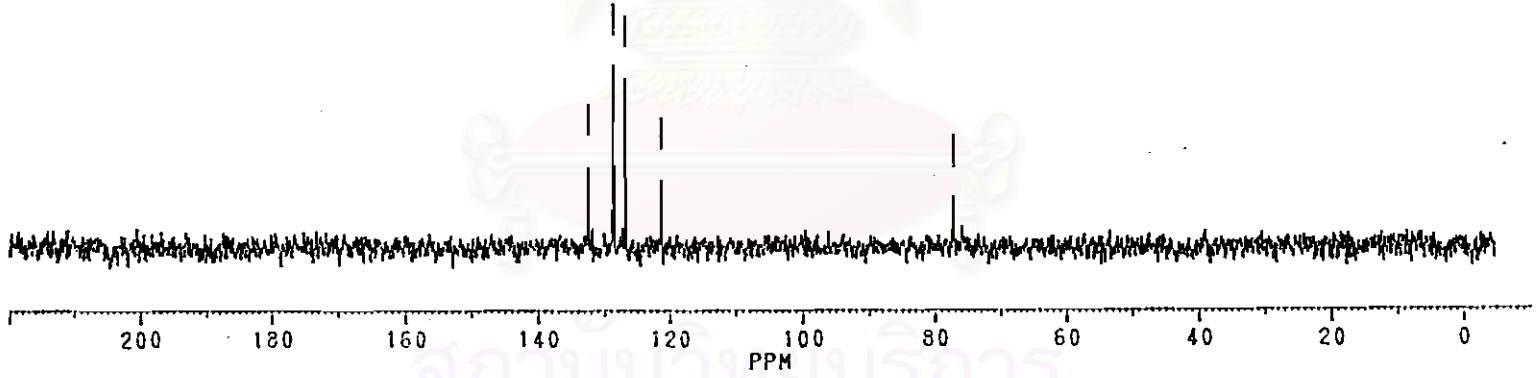

Figure D5. ^{13}C-NMR spectrum (DEPT 90) of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-ethylphenyl)oxazole in $CDCl_3$, TMS internal marker.

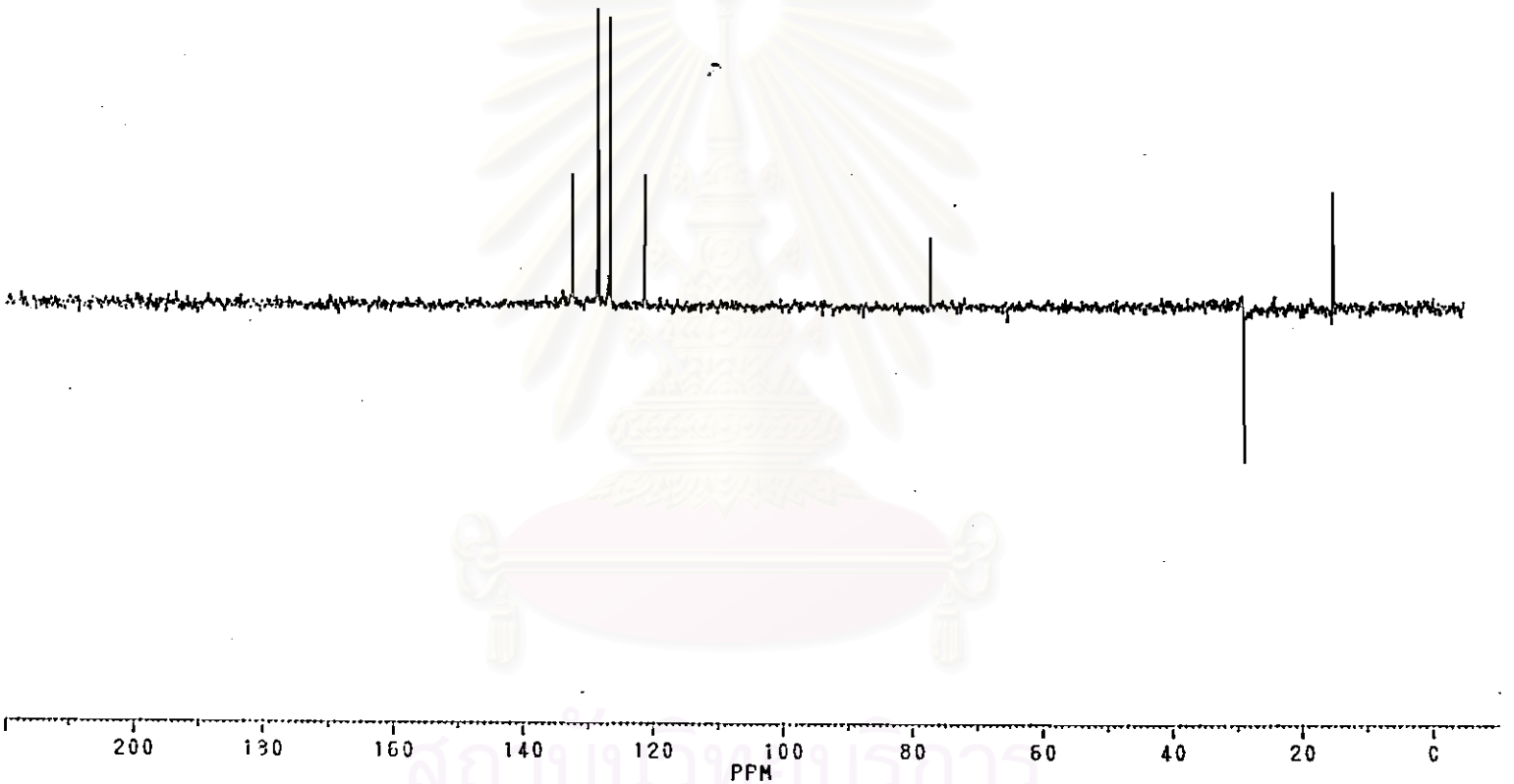

Figure D6. ^{13}C-NMR spectrum (DEPT 135) of 4-chloro-5-(3′, 4′-dinitrophenyl)-2-(4-ethylphenyl)oxazole in $CDCl_3$, TMS internal marker.

VITA

Mr. Sutheerawat Samingprai was born on July 25, 1969 in Bangkok. He recieved a Bachelor's Degree of Science in Chemistry from Chulalongkorn University in 1993. He has been a graduate student of the Multidiscriplinary Program of Petrochemistry and Polymer Science, Graduate School, Chulalongkorn University, since 1998.