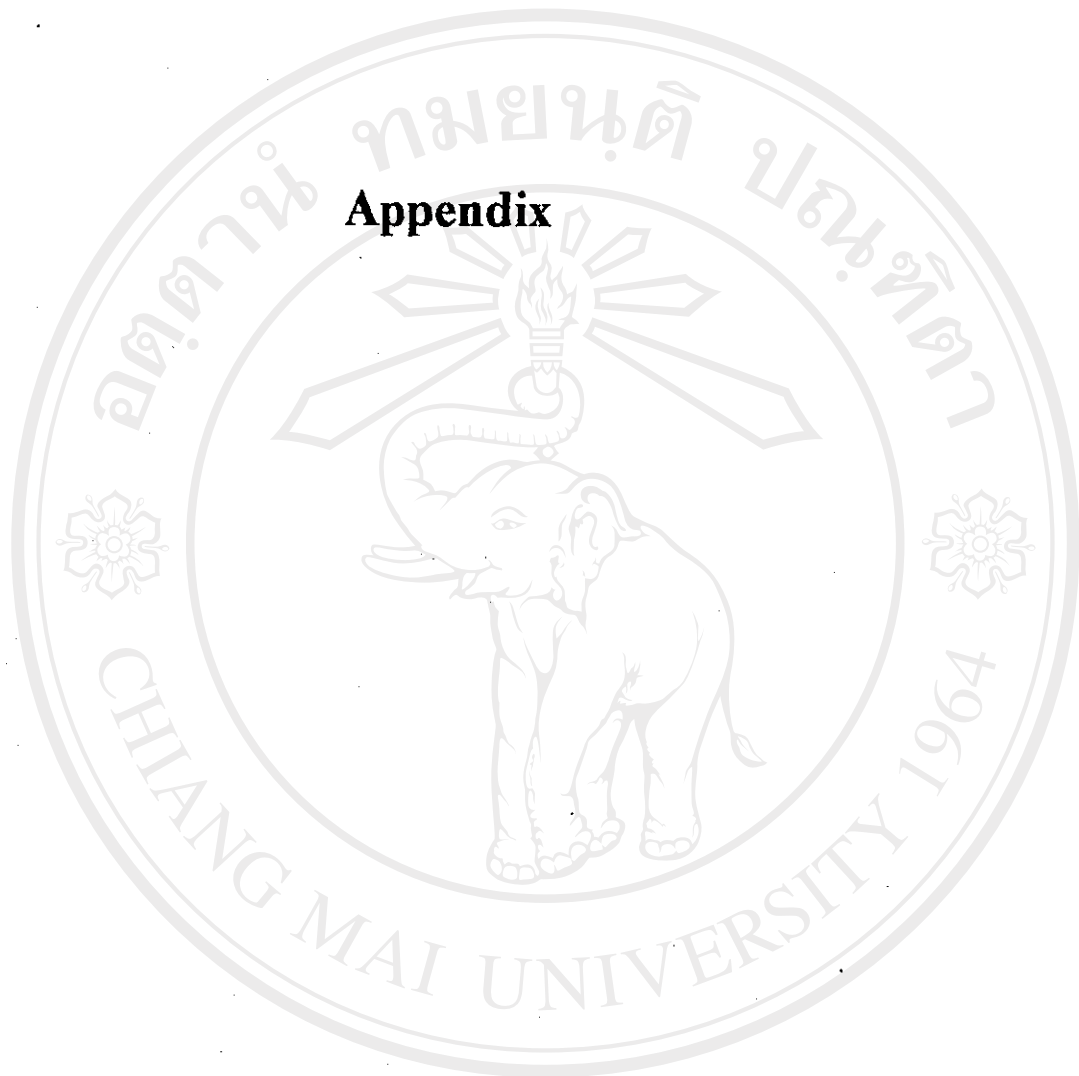


Appendix

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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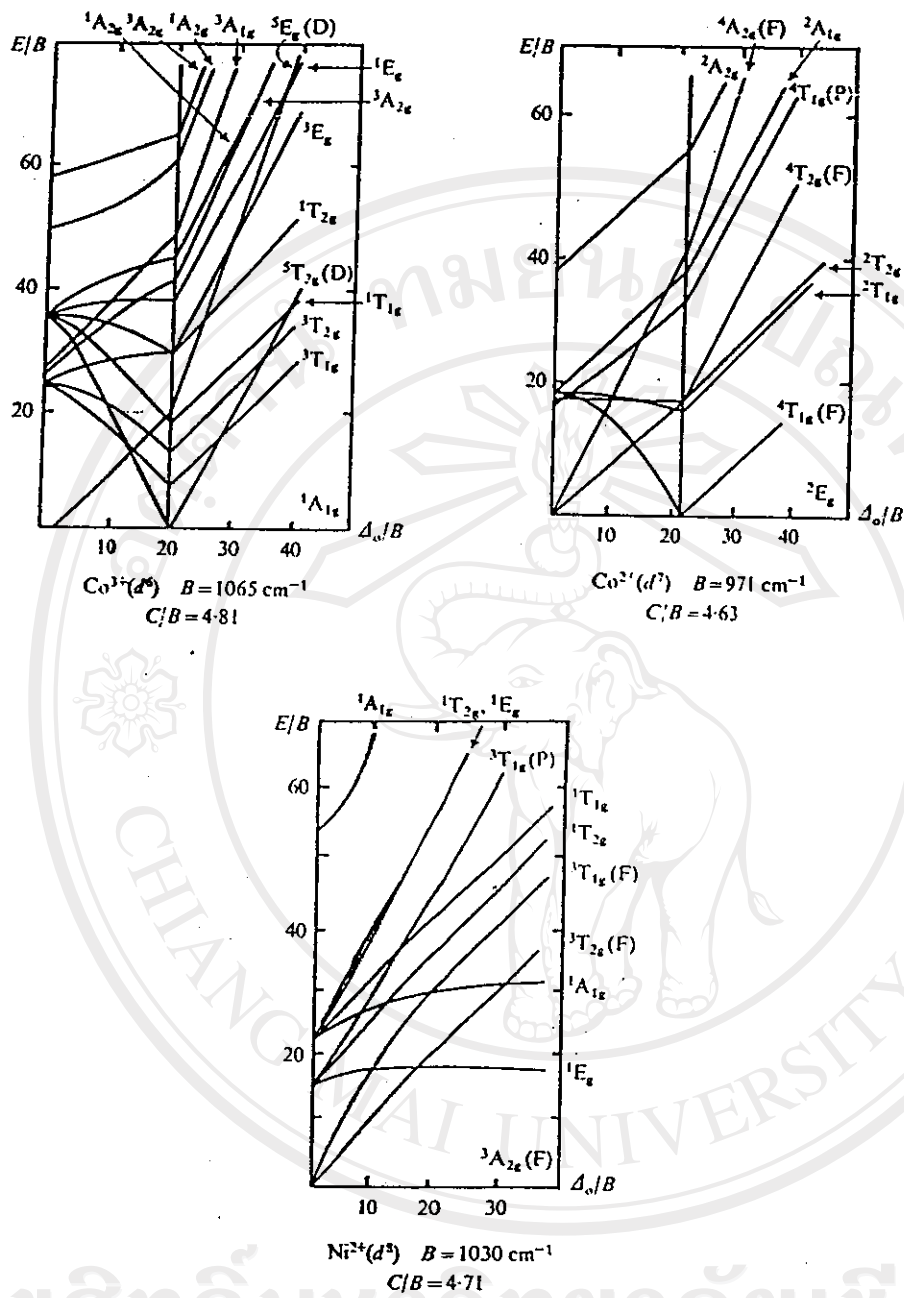
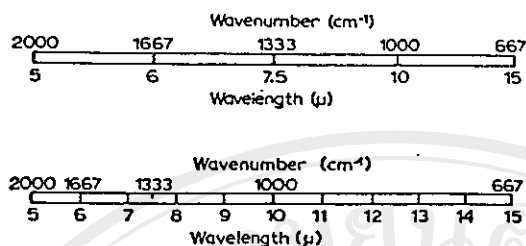


Fig.A1 Tanabe-Sugano diagrams for the ions Co³⁺(d⁶), Co²⁺(d⁷) and Ni²⁺(d⁸) respectively, in octahedral complexes ⁽¹⁴⁾

Fig.AII Linear wavelength and linear wavenumber presentation⁽²⁹⁾Table AI Some common Polydentrate ligands⁽³⁰⁾

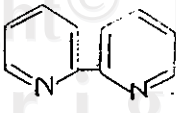
Ligands	Formula	Mode of coordination
Ethylenediamine	$\text{H}_2\text{NCH}_2\text{CH}_2\text{NH}_2$	Though both N atoms giving a five membered ring
Carboxylic acids	$(\text{CH}_2)_n(\text{COOH})_2$ (n=0,1,2 etc)	A proton is lost from each COOH group and the two O ⁻ atoms co-ordinate giving a (5+n) ring
Dimethylglyoxime	$\text{CH}_3\text{C}(=\text{NOH})\text{C}(=\text{NOH})\text{CH}_3$	One proton lost and coordinates though both N atoms giving five member ring. Further six-membered ring form by hydrogen bonding between NOH and ON
2,2'-dipyridyl		Though both N atoms giving five member ring

Table AII Electronic spectrum of nickel complexes

	$3A_{2g} \rightarrow 3T_{2g}$	$3A_{2g} \rightarrow 1E_g$	$3A_{2g} \rightarrow 3T_{1g}(F)$	$3A_{2g} \rightarrow 1T_{1g}$	$3A_{2g} \rightarrow 3T_{1g}(P)$	Ref.
$[Ni(NH_3)_6]^{2+}$	930	-	571	-	355	11
$Ni(en)_2^{2+}$	-	-	464	-	-	25
$Ni(en)_3^{2+}$	892	-	545	-	345	16
$Ni(DMG)_2^*$	475	-	410	-	370	26
$Ni(bipy)_3^{2+*}$	791	870	521	-	385	27
$[Ni(H_2O)_6]^{2+}$	1176	658	725	455	395	15
$NiCl_2$	1389	806	870	521	457	13

* = Nigel Davison reported band of $Ni(DMG)_2$ at 534 nm and $Ni(bipy)_3^{2+}$ at 536 nm on clay surfaces⁽¹⁷⁾

Table AIII Electronic spectrum of NiCl_4^{2-}

	$^3T_1 \rightarrow ^3A_2$	$^3T_1 \rightarrow ^1E$	$^3T_1 \rightarrow ^3T_1(P)$	$^3T_1 \rightarrow ^1T_2$	Ref.
NiCl_4^{2-}	1325	860	702	505	12

Table AIV Electronic spectrum of cobalt(III) complexes

	$^1A_{1g} \rightarrow ^3T_{1g}$	$^1A_{1g} \rightarrow ^3T_{2g}$	$^1A_{1g} \rightarrow ^1T_{1g}$	$^1A_{1g} \rightarrow ^1T_{2g}$	Ref.
$[\text{Co}(\text{NH}_3)_6]^{3+}$	796	-	472	339	14
Coen_3^{3+}	730	571	464	338	18,19
$[\text{Co}(\text{H}_2\text{O})_6]^{3+}$	1250	800	606	405	28

Table AV Electronic spectrum of cobalt(II) complexes

	$4T_{1g} \rightarrow 4T_{2g}$	$4T_{1g} \rightarrow 4A_{2g}$	$4T_{1g} \rightarrow 4T_{1g}(P)$	$4T_{1g} \rightarrow 2E_g$	Ref.
$[\text{Co}(\text{NH}_3)_6]^{2+}$	1111	-	474	-	27
CoCl_2	1515	701-752	580	-	21
$[\text{Co}(\text{H}_2\text{O})_6]^{2+}$	1250	625	500	885	27
CoCl_4^{2-} *	-	625	516	-	29
$[\text{Co}(\text{bipy})_3]^{2+}$	-	-	540	-	22

* = P. Day and C.K. Jorgensen reported charge transfer at 238 nm(21)

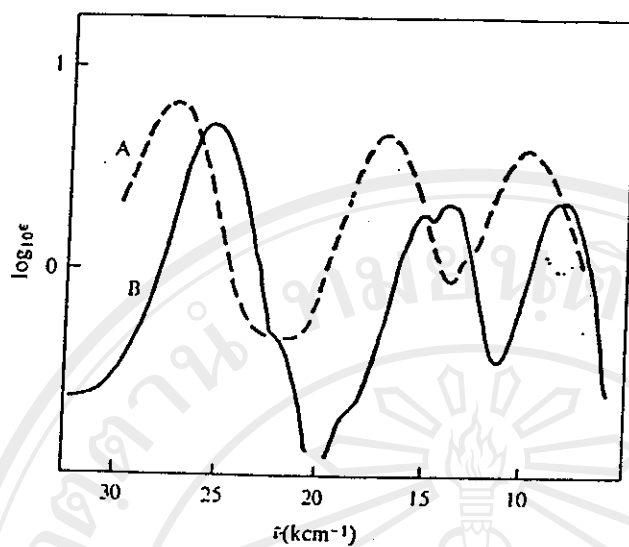


Fig.AIII Electronic spectra for nickel complexes,
(A) $[\text{Ni}(\text{NH}_3)_6]^{2+}$, (B) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ (14)

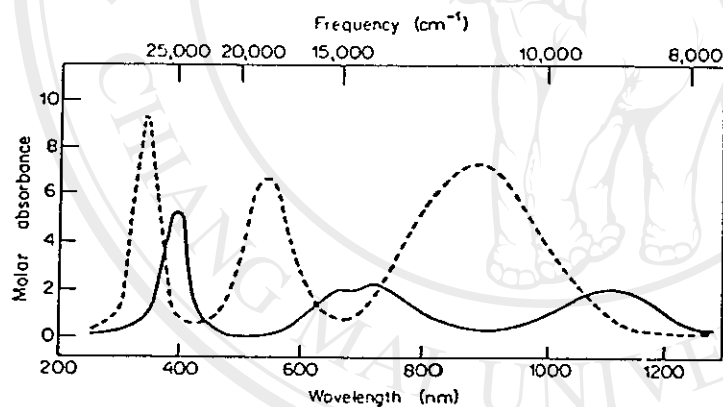


Fig.AIV Electronic spectra of (A) $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ and
(B) $\text{Ni}(\text{en})_3^{2+}$ (31)

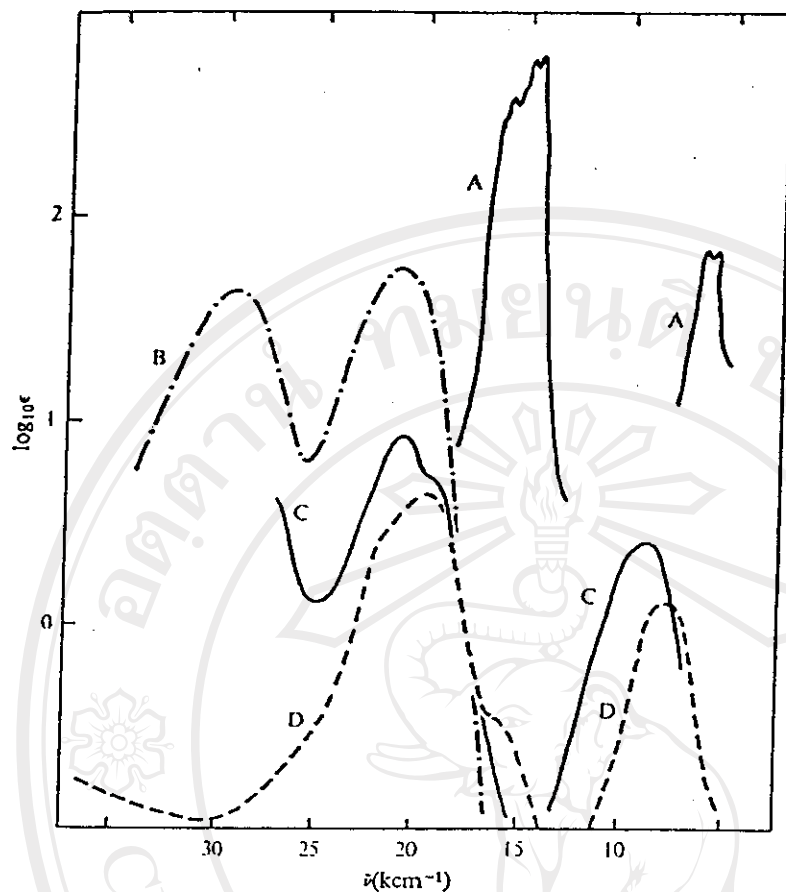


Fig.AV Electronic spectra for cobalt complexes, (A) $[\text{CoCl}_4]^{2-}$, (B) $[\text{Co}(\text{NH}_3)_6]^{2+}$, (C) $[\text{Co}(\text{NH}_3)_6]^{3+}$, (D) $[\text{Co}(\text{H}_2\text{O})_6]^{2+}$ (14)

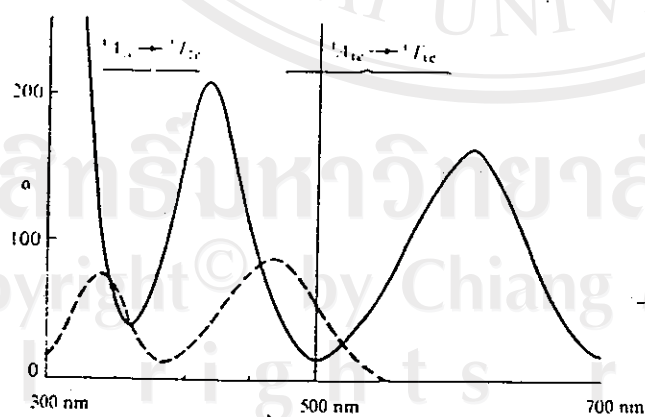


Fig.AVI Electronic spectra of (A) Coen_3^{3+} and (B) $\text{Co}(\text{ox})_3^{3-}$ (32)

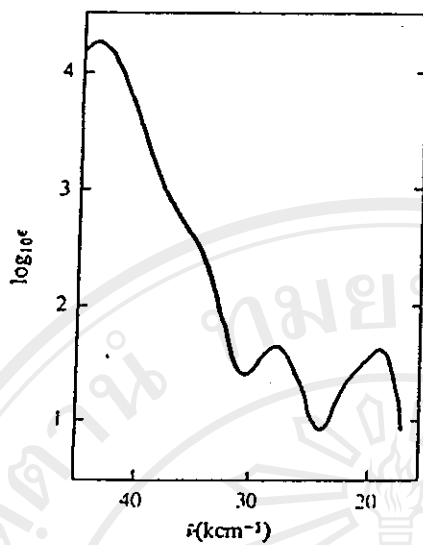


Fig.AVII Electronic spectra of $[\text{Co}(\text{NH}_3)_5\text{Cl}]\text{Cl}_2$ ⁽¹⁴⁾

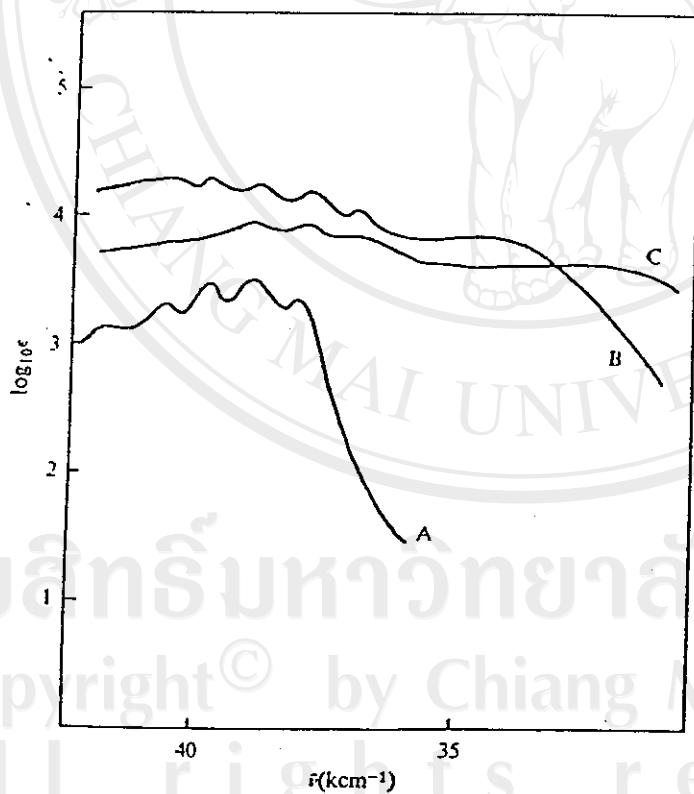


Fig.AVIII Electronic spectra of (A) pyridine, (B) $[\text{Ir}(\text{py})_4\text{Cl}_2]^+$, and (C) $[\text{Ir}(\text{py})_2(\text{NH}_3)_3\text{OH}]^{2+}$ ⁽¹⁴⁾

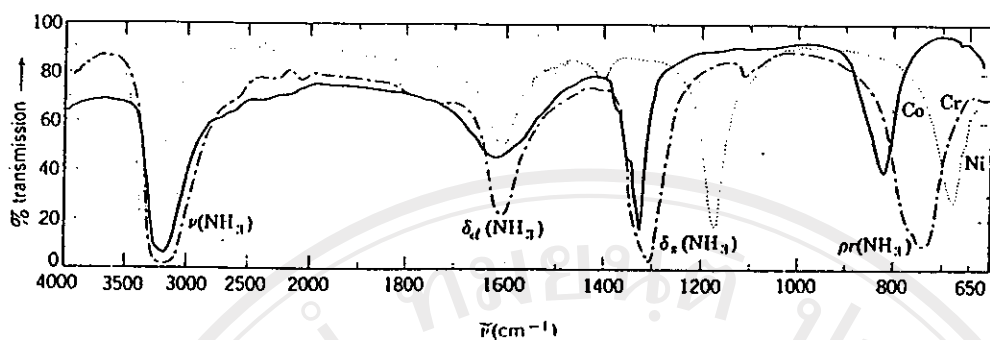
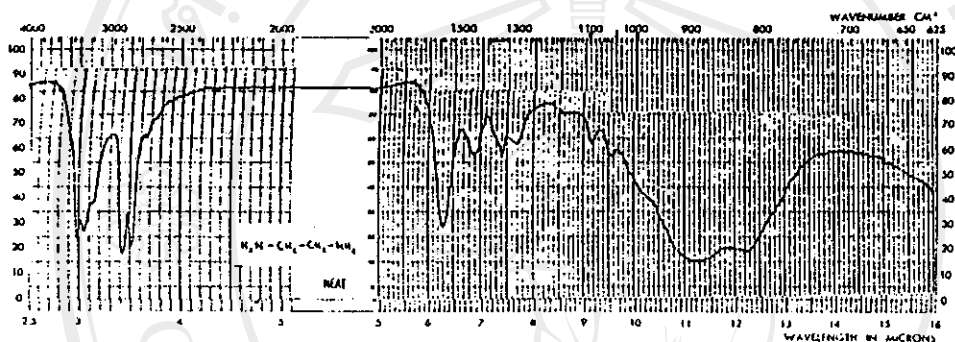
Fig.AIX Infrared spectrum of NH_3 (33)

Fig.AX Infrared spectrum of ethylenediamine (34)

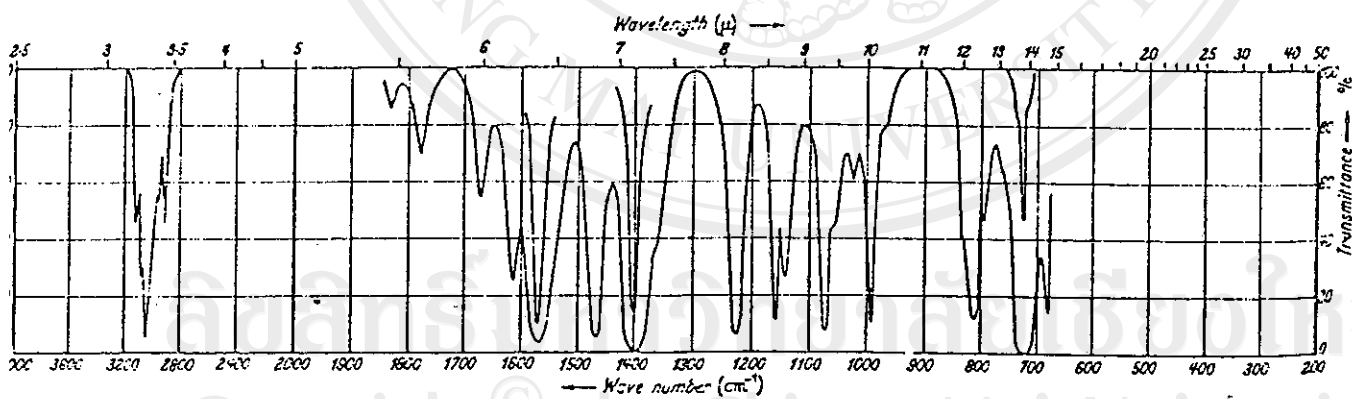


Fig.AXI Infrared spectrum of pyrimidine(35)

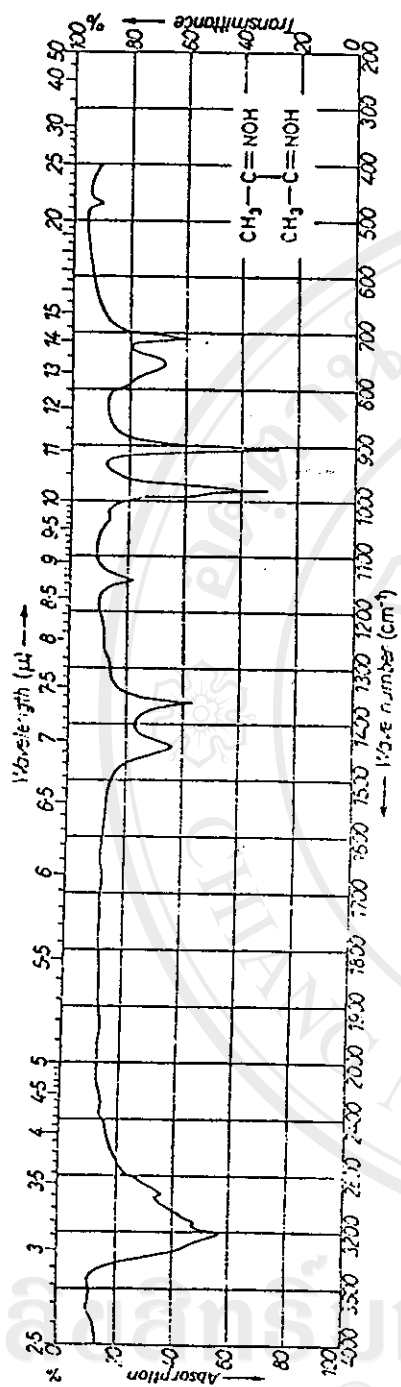


Fig.AXII Infrared spectrum of DMG (35)

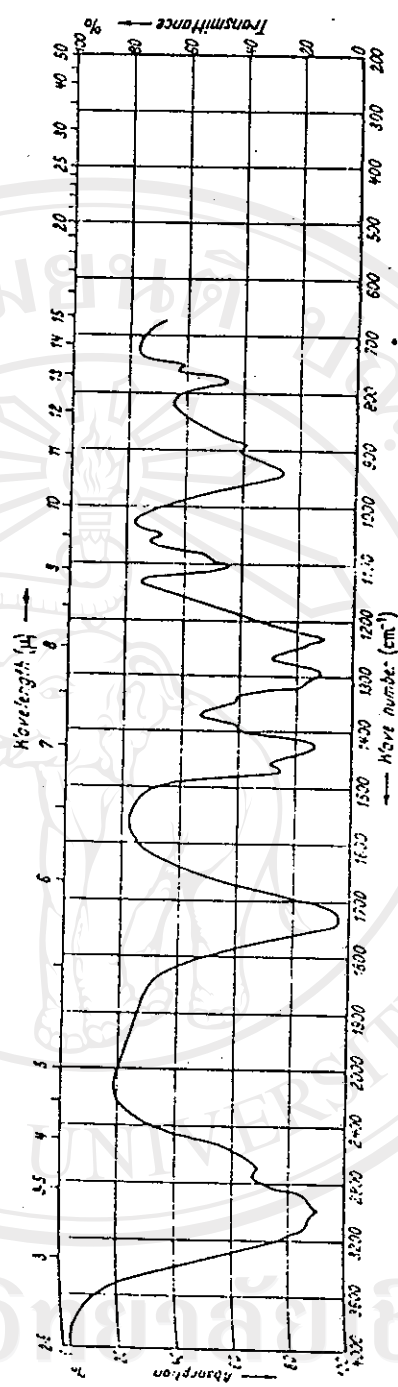
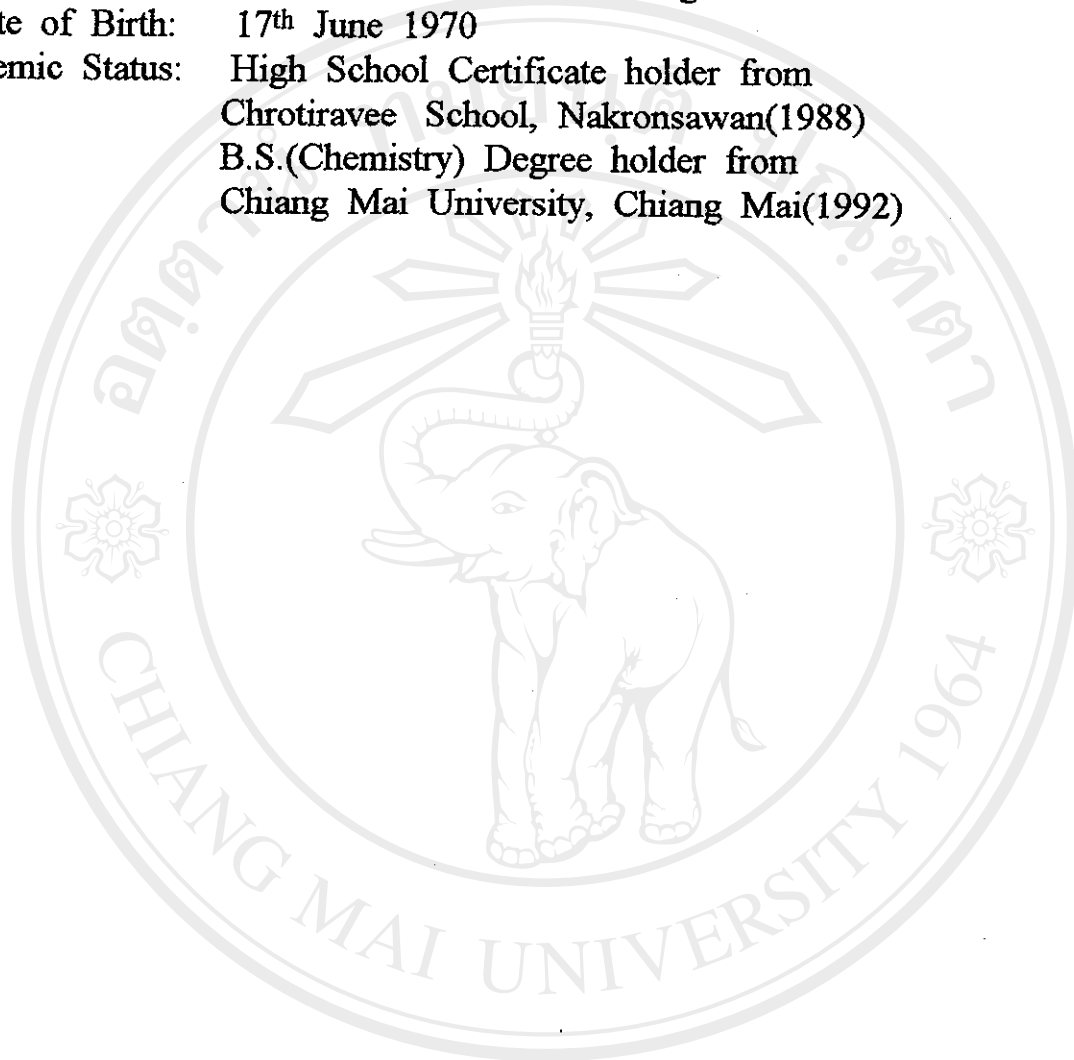


Fig.AXIII Infrared spectrum of butyric acid (35)

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