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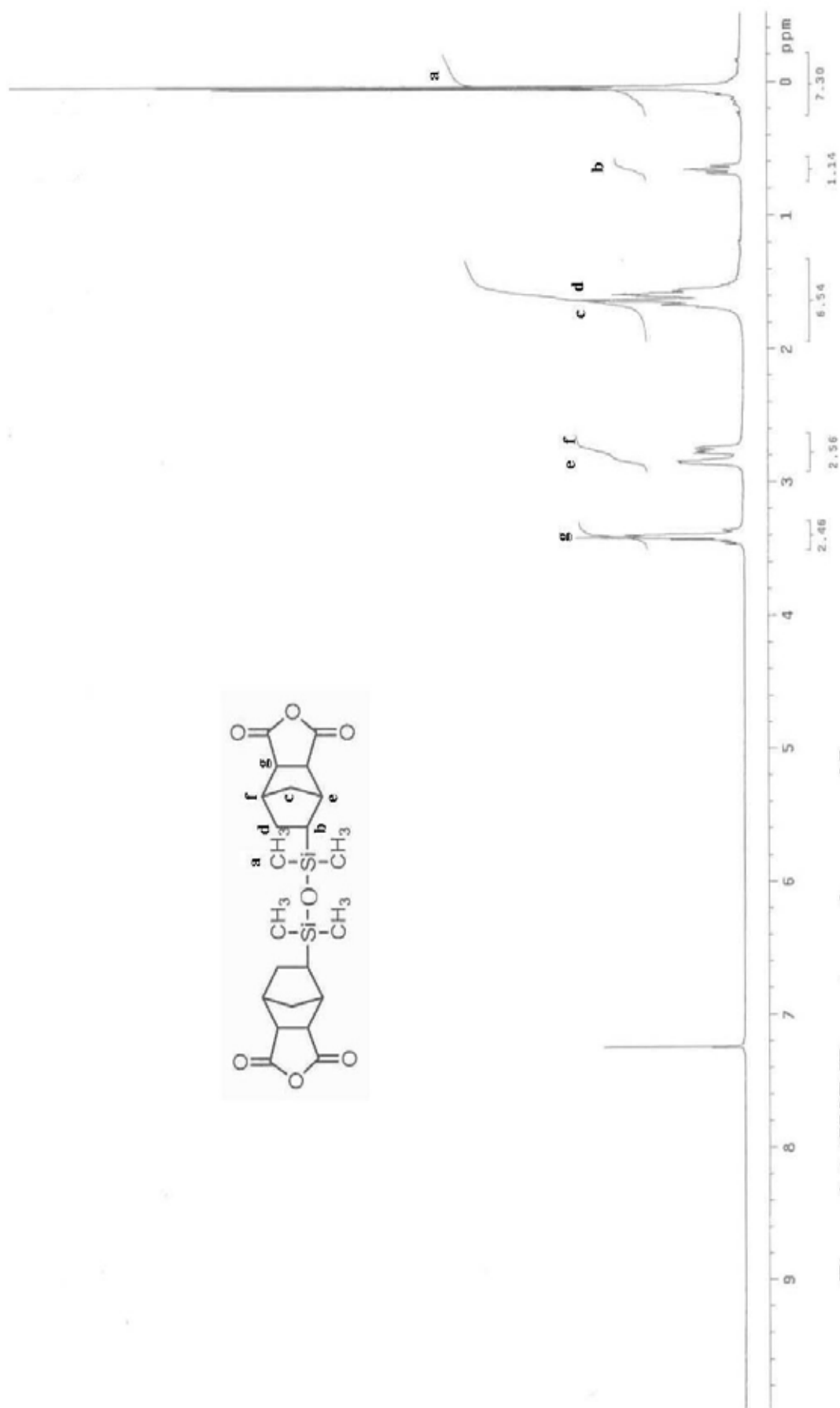


Figure 3-1 ¹H NMR spectrum of compound I

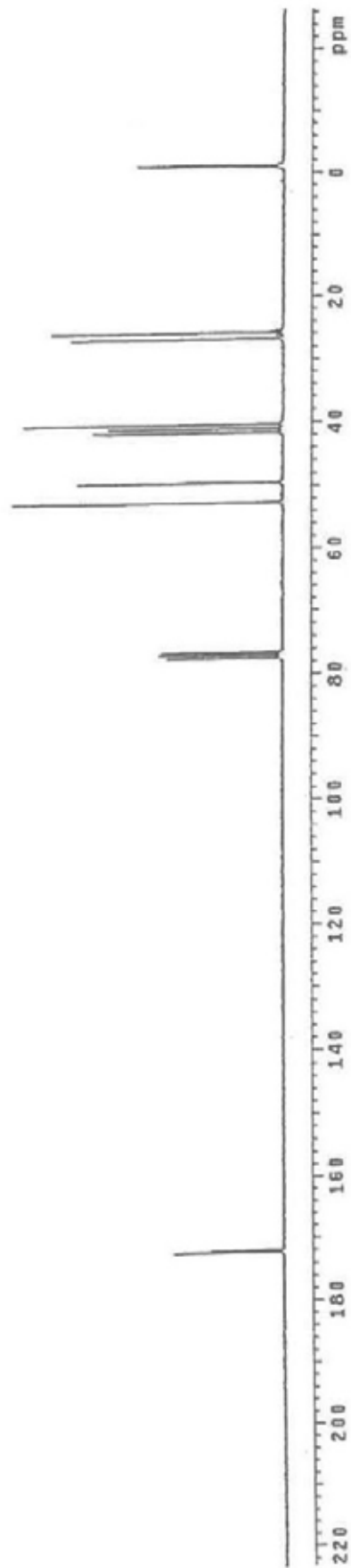
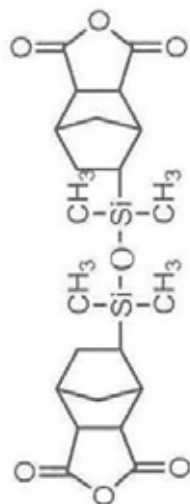


Figure 3-2 ¹³C NMR spectrum of compound I

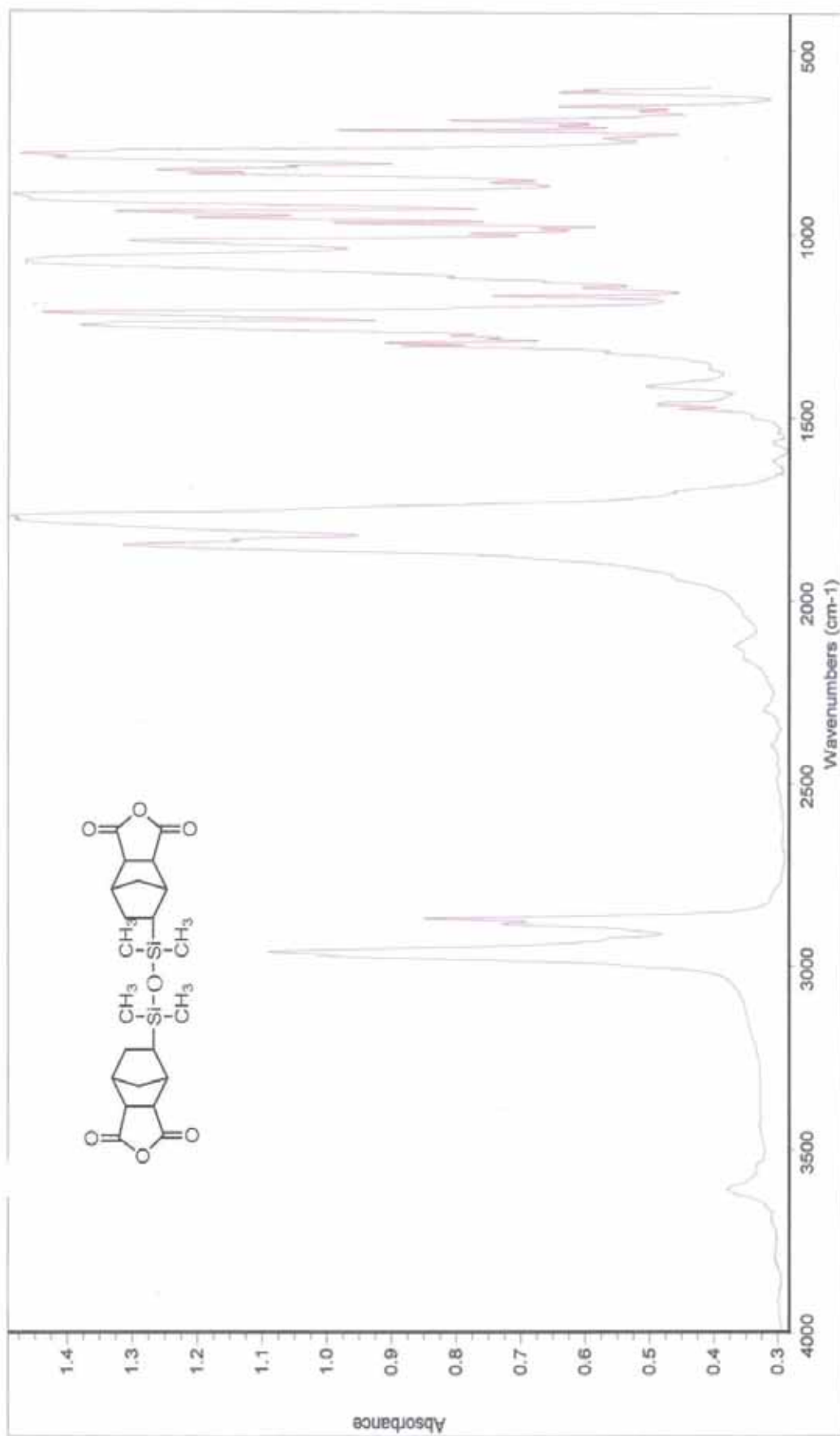


Figure 3-3 FT-IR spectrum of compound I



Figure 3-4 MASS spectrum of compound I

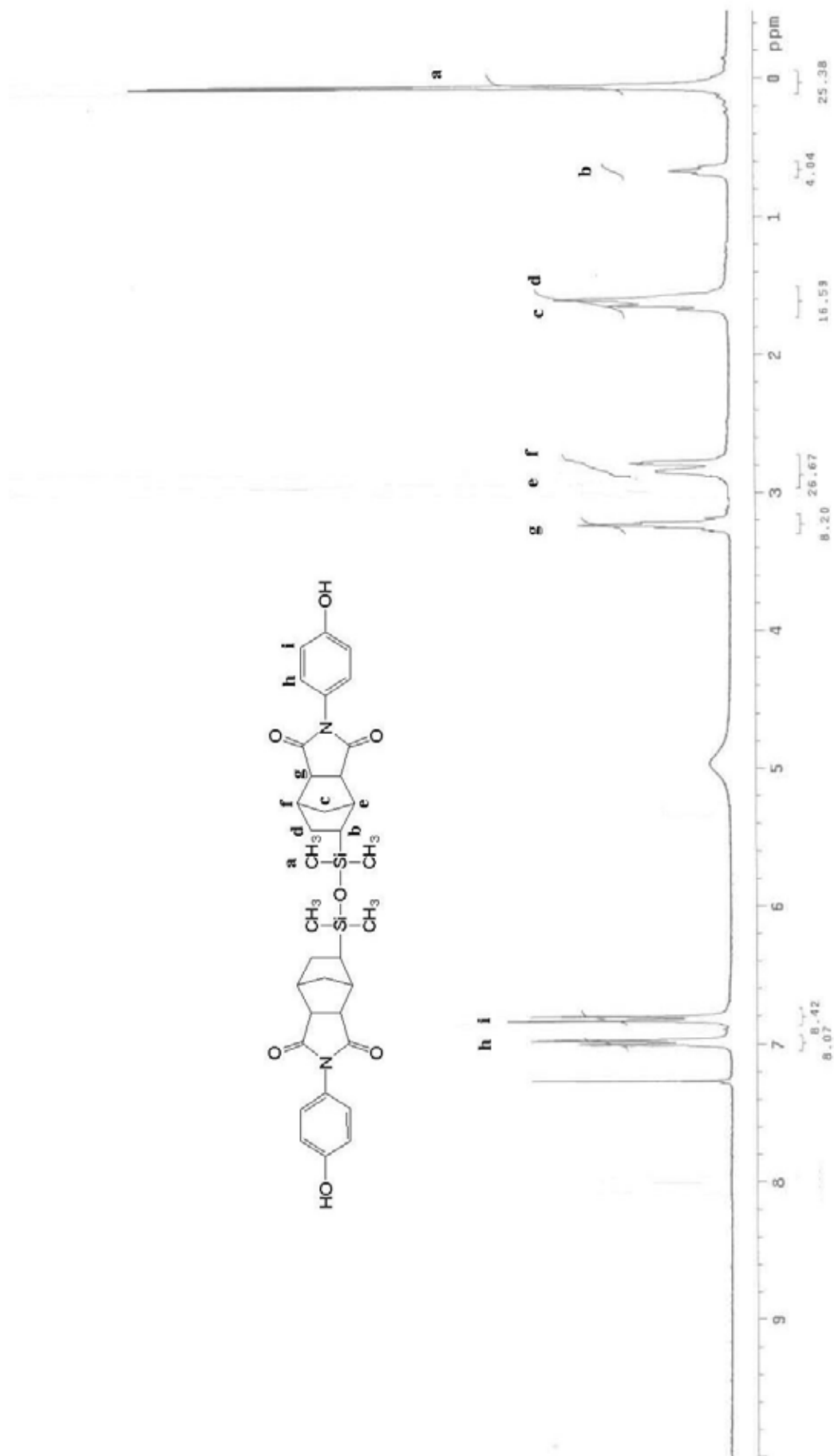


Figure 3-5 ¹H NMR spectrum of compound II

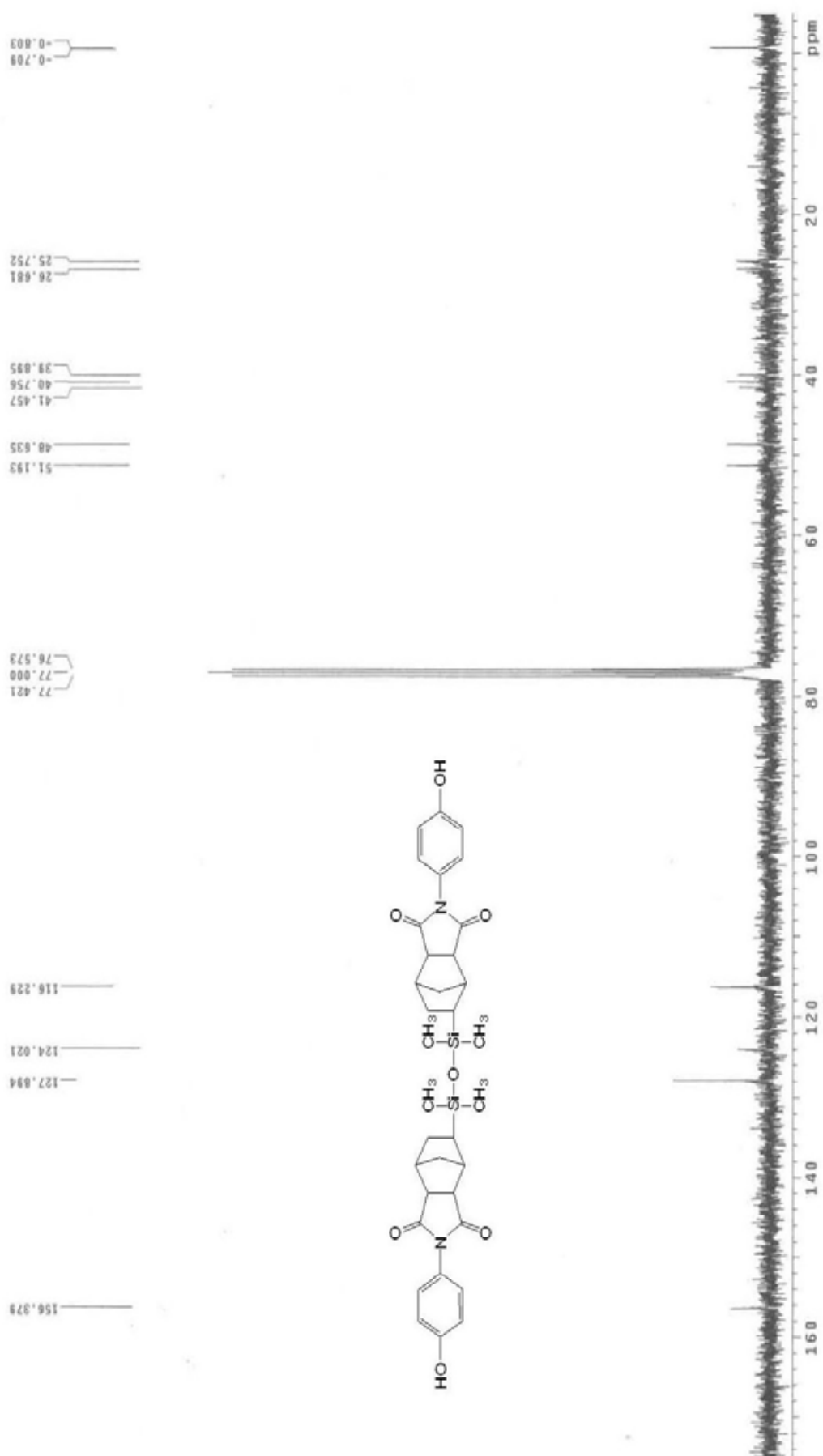


Figure 3-6 ^{13}C NMR spectrum of compound II

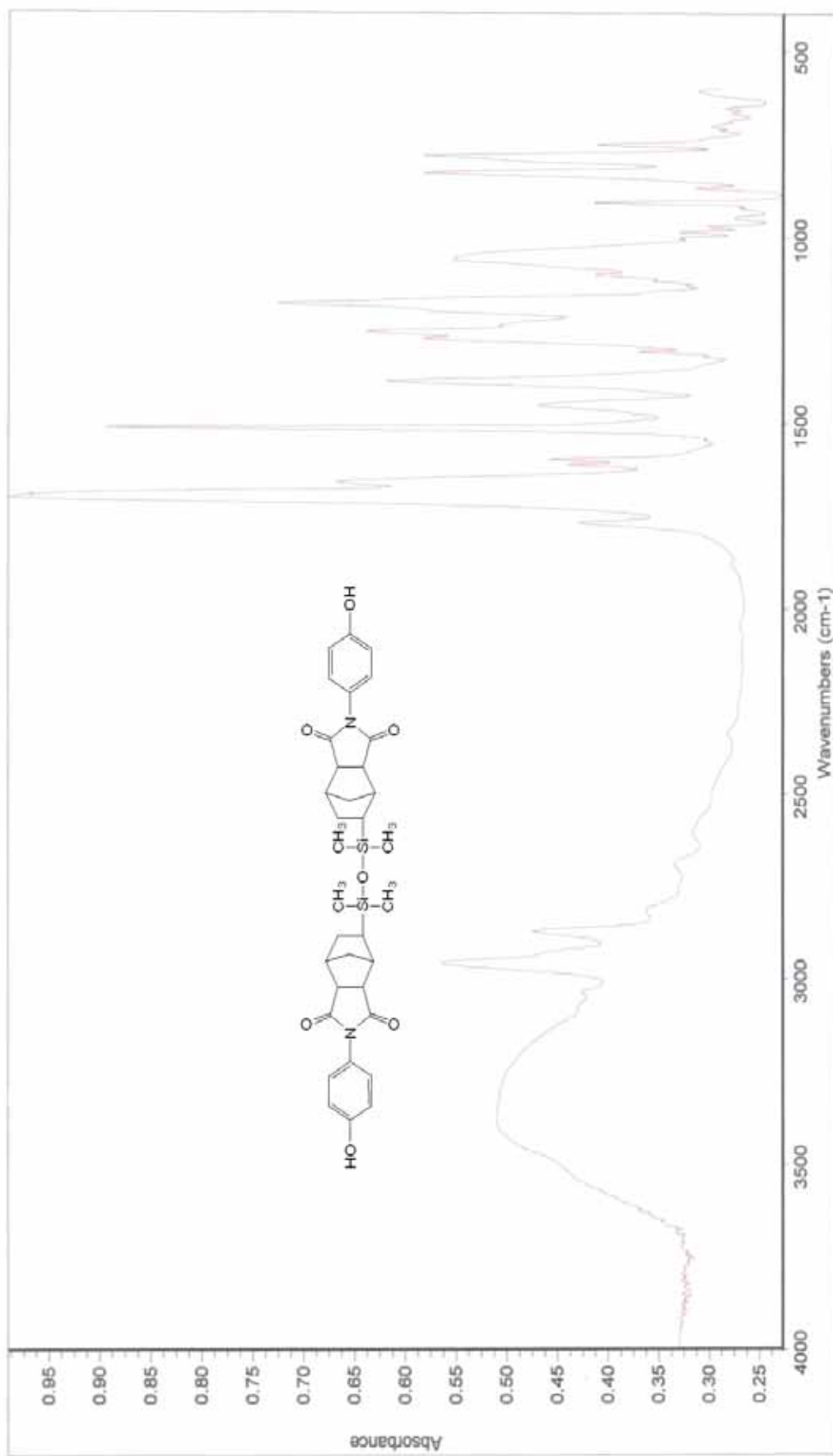


Figure 3-7 FT-IR spectrum of compound II

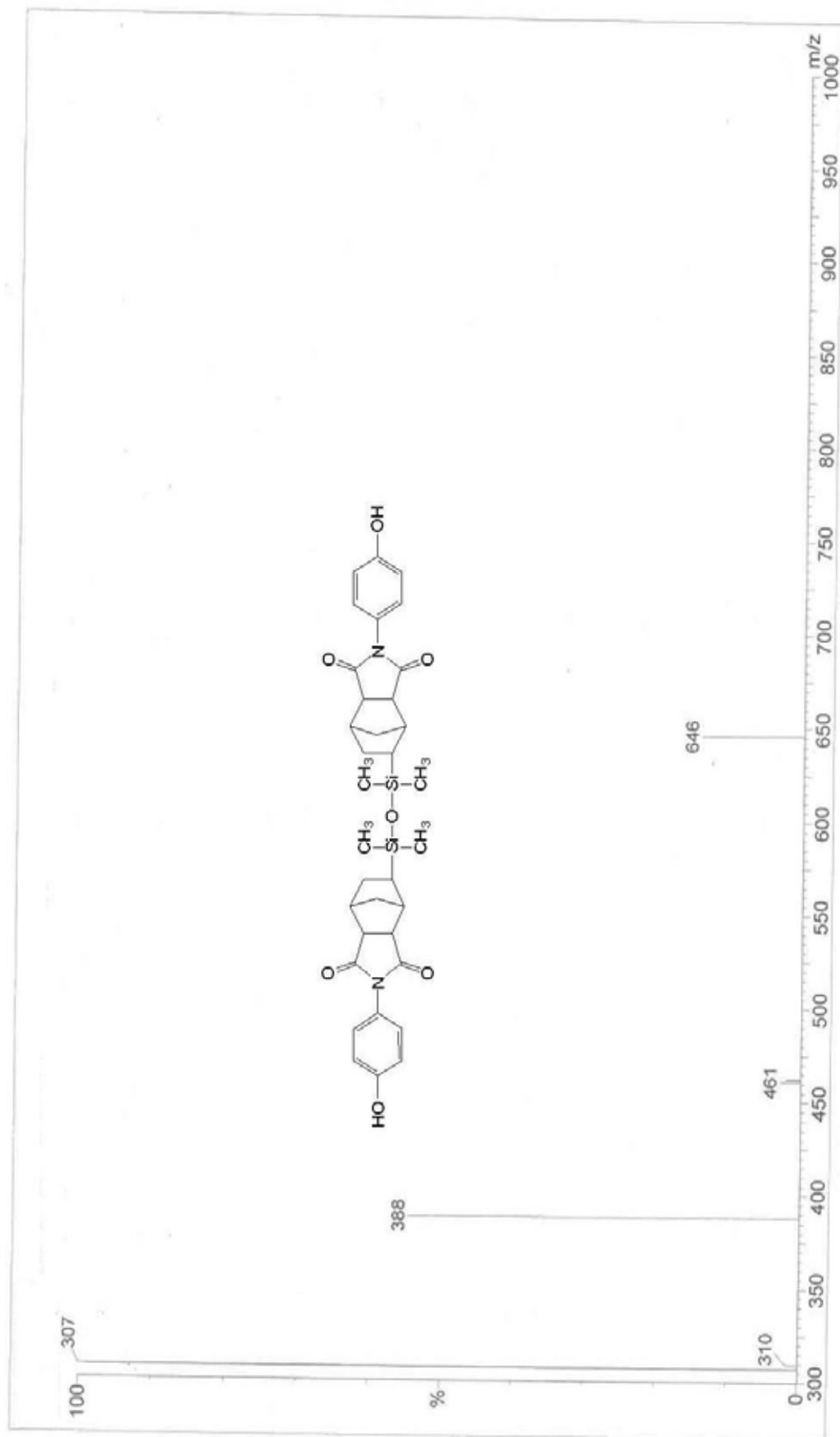


Figure 3-8 MASS spectrum of compound II

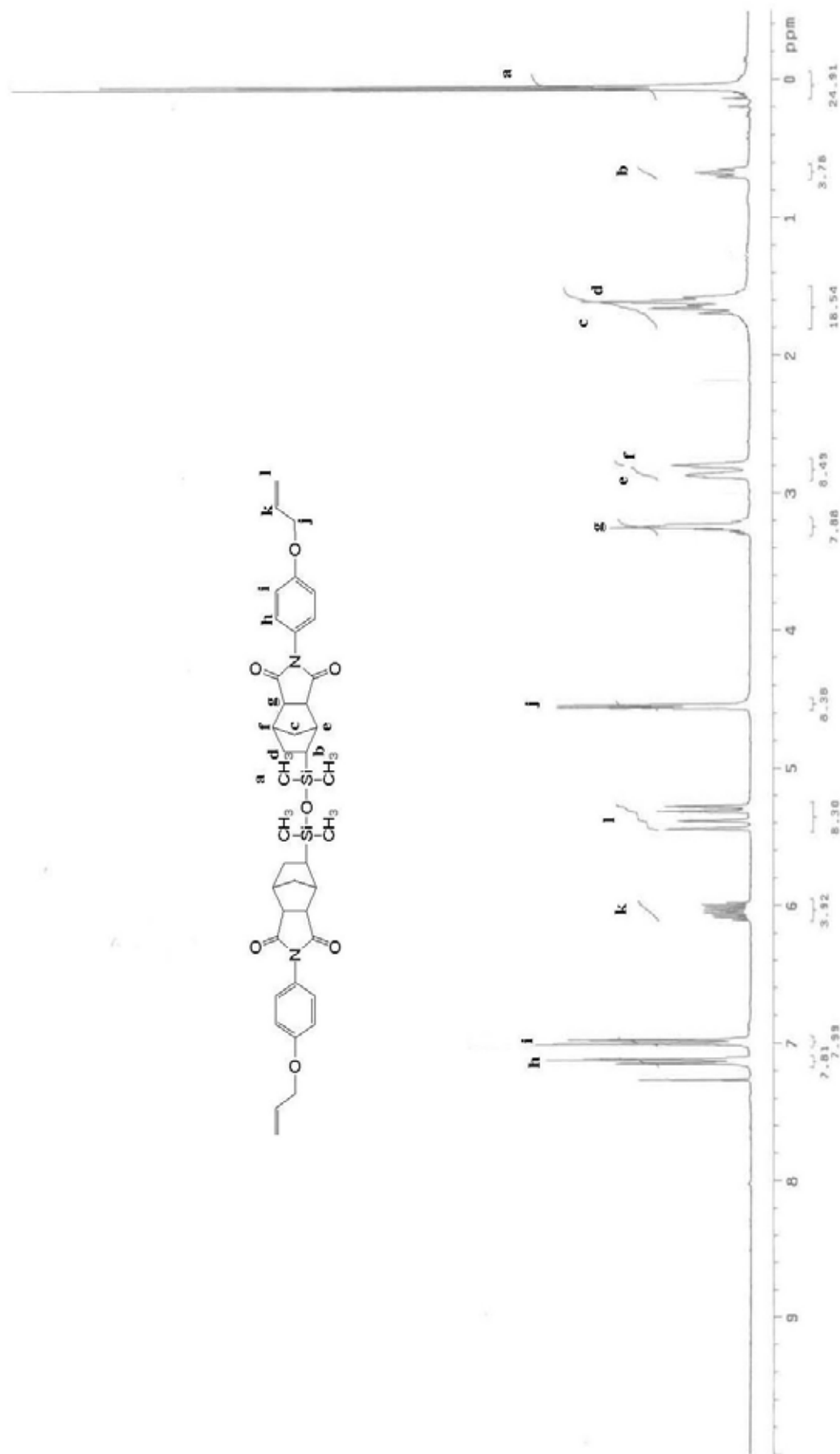


Figure 3-9 ¹H NMR spectrum of compound III

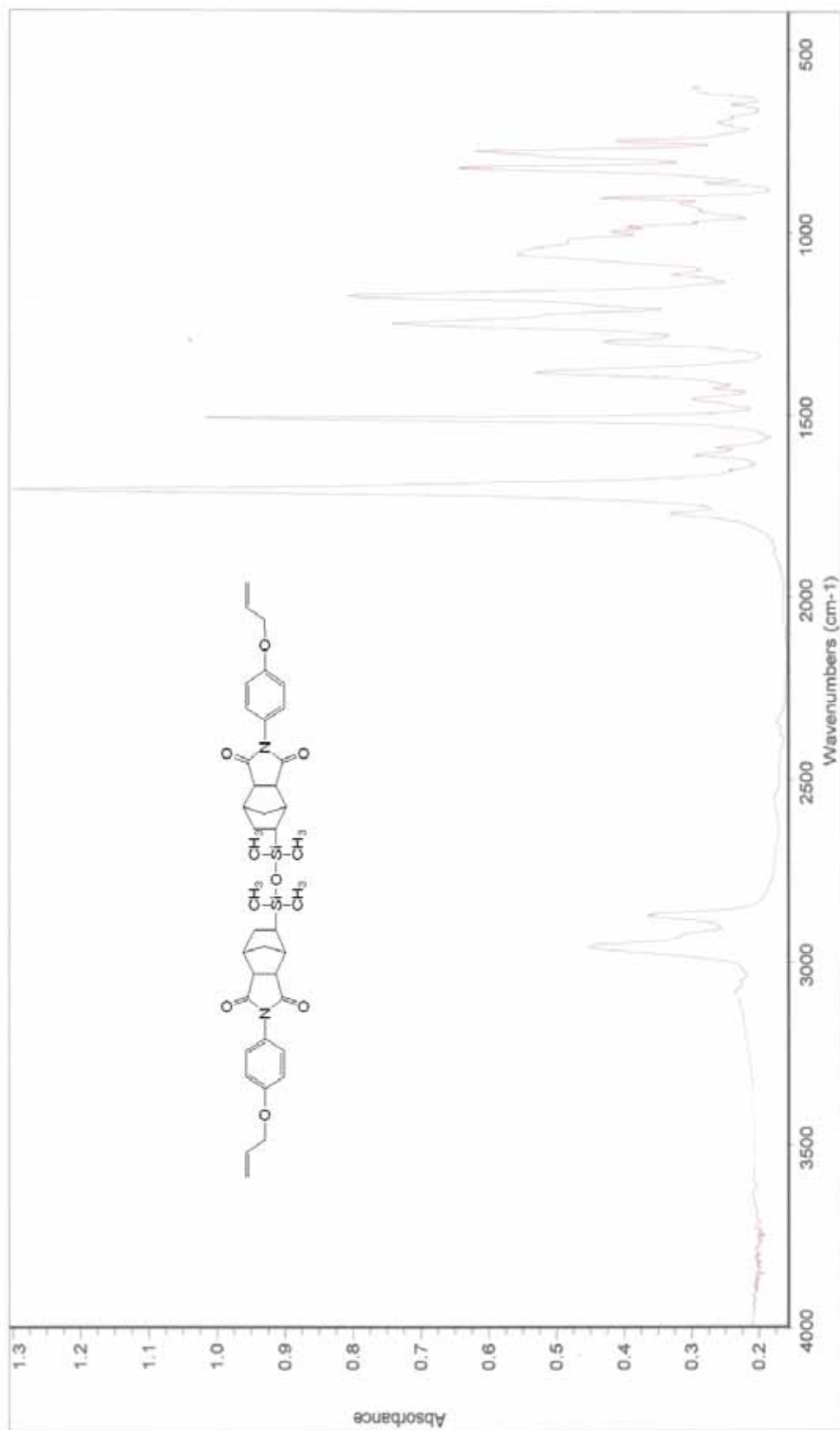


Figure 3-11 FT-IR spectrum of compound III



Figure 3-12 MASS spectrum of compound III

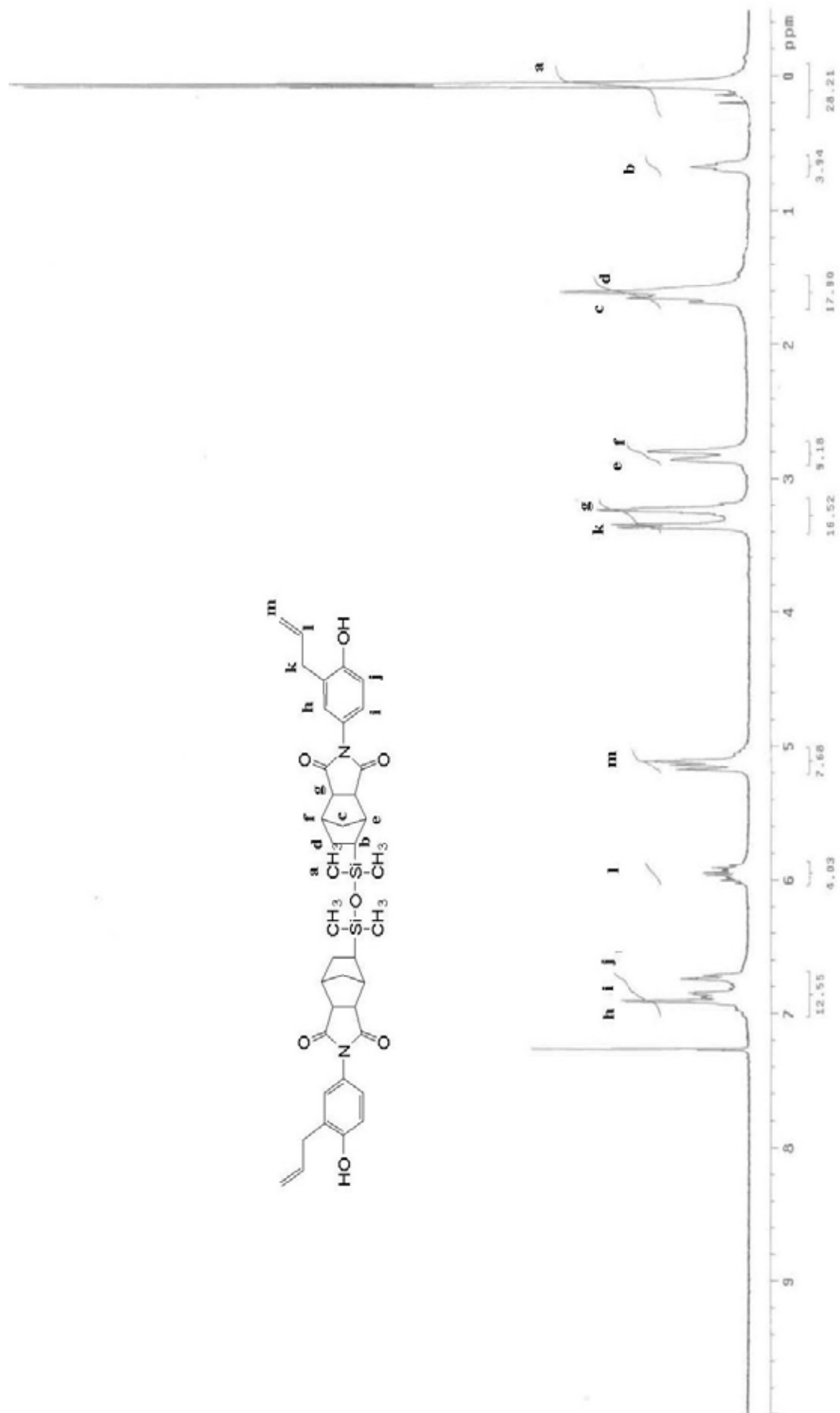


Figure 3-13 ¹H NMR spectrum of compound IV

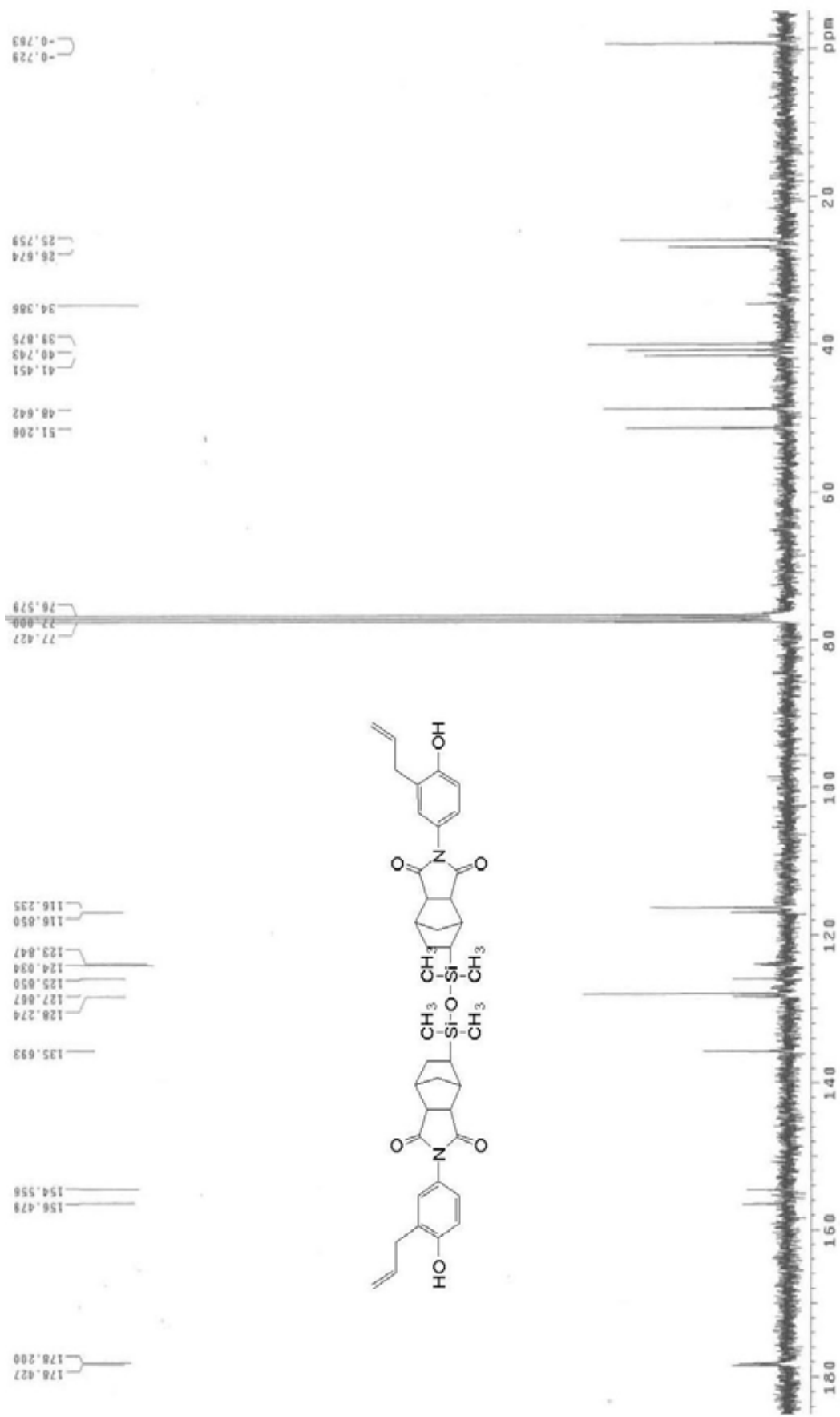


Figure 3-14 ¹³C NMR spectrum of compound IV

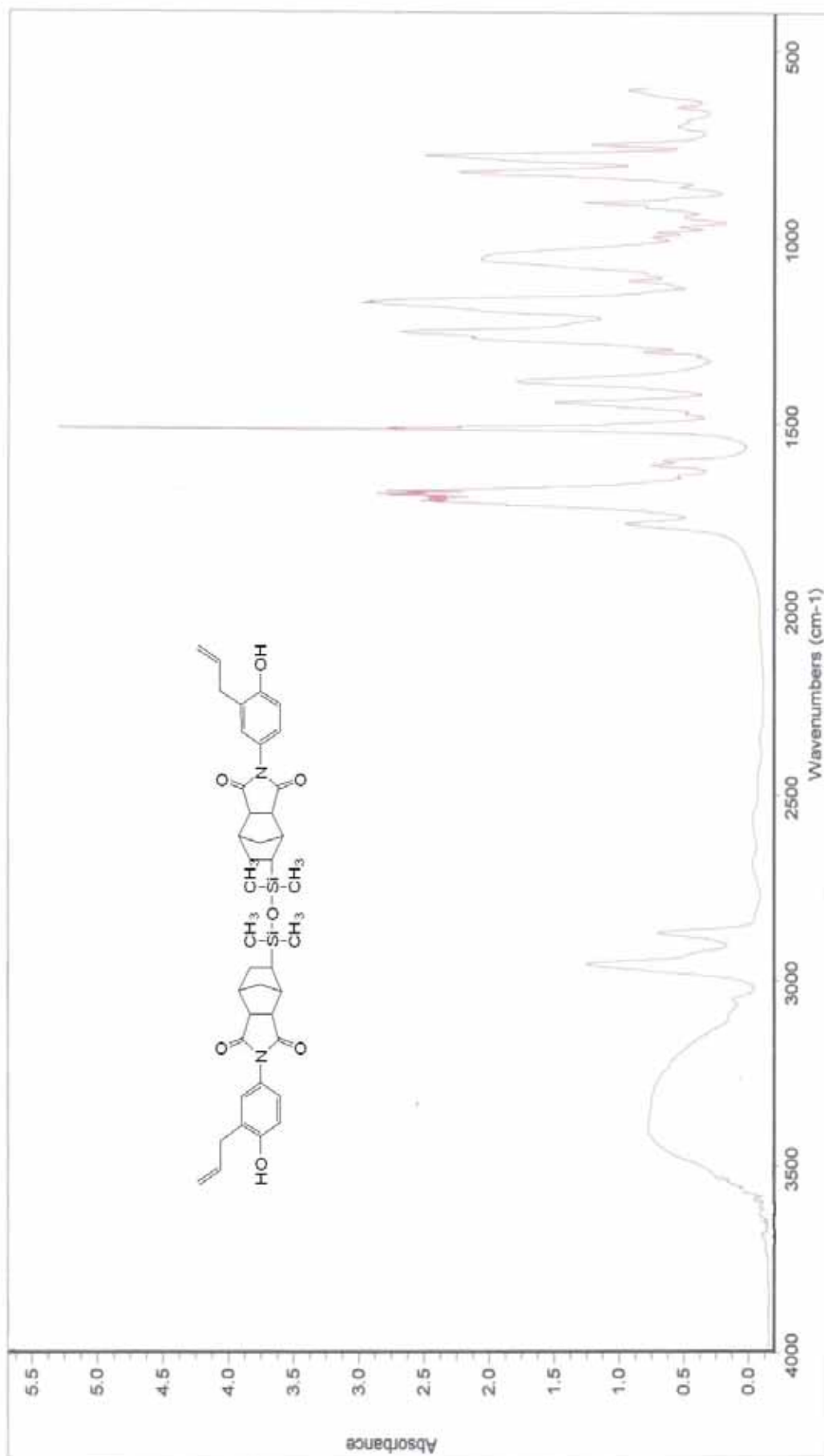


Figure 3-15 FT-IR spectrum of compound IV

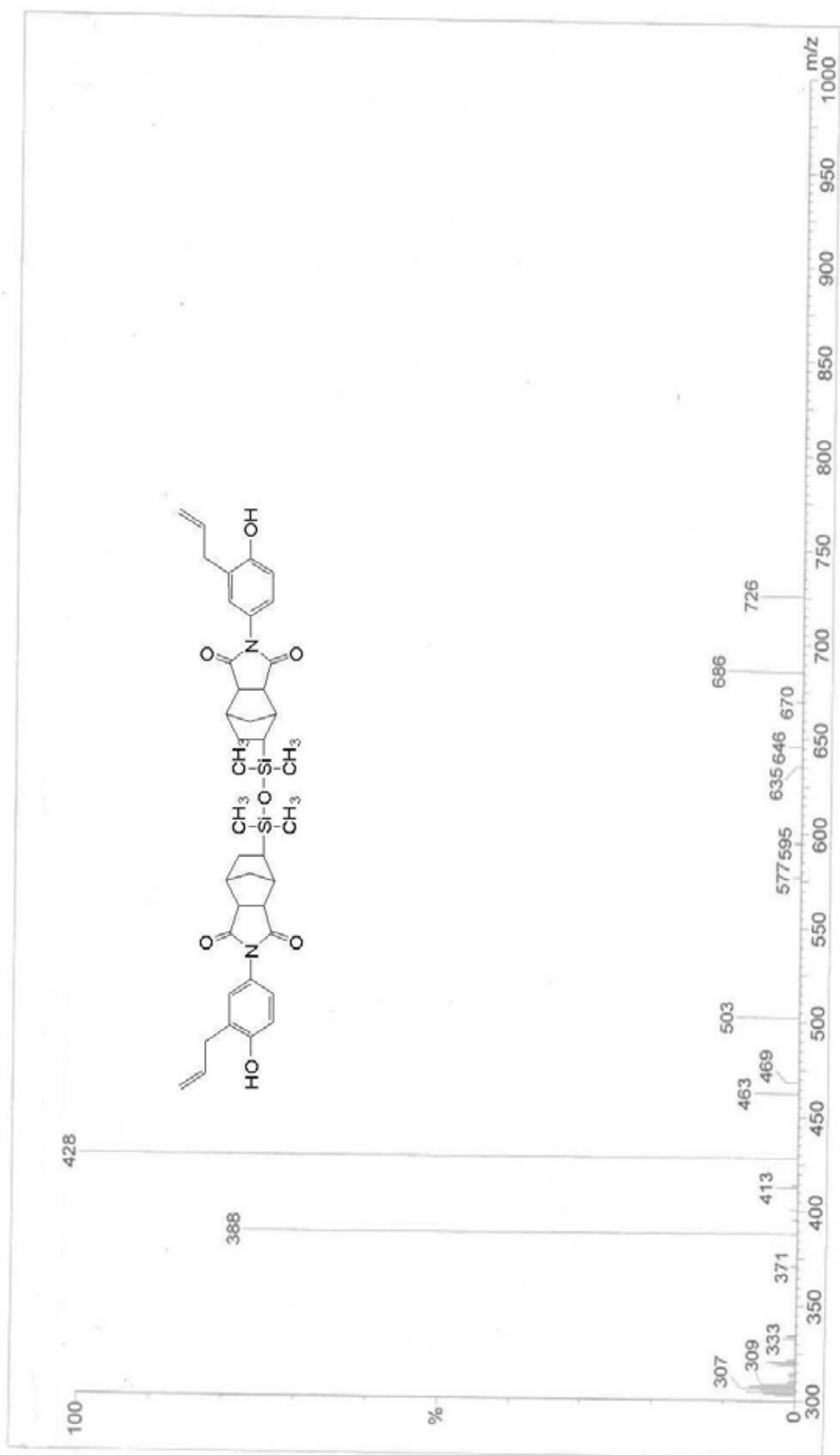


Figure 3-16 MASS spectrum of compound IV

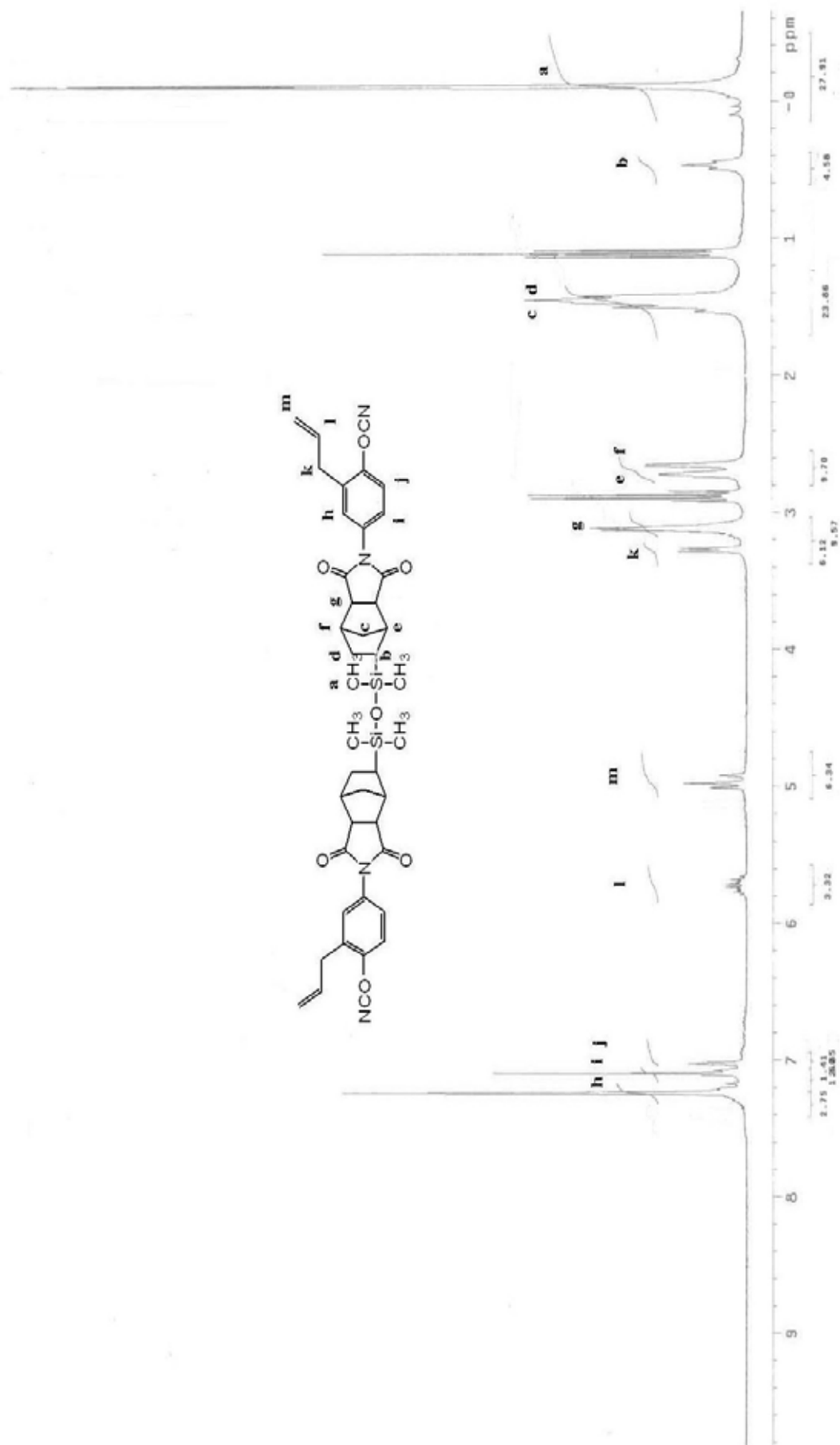


Figure 3-18 ¹H NMR spectrum of compound V

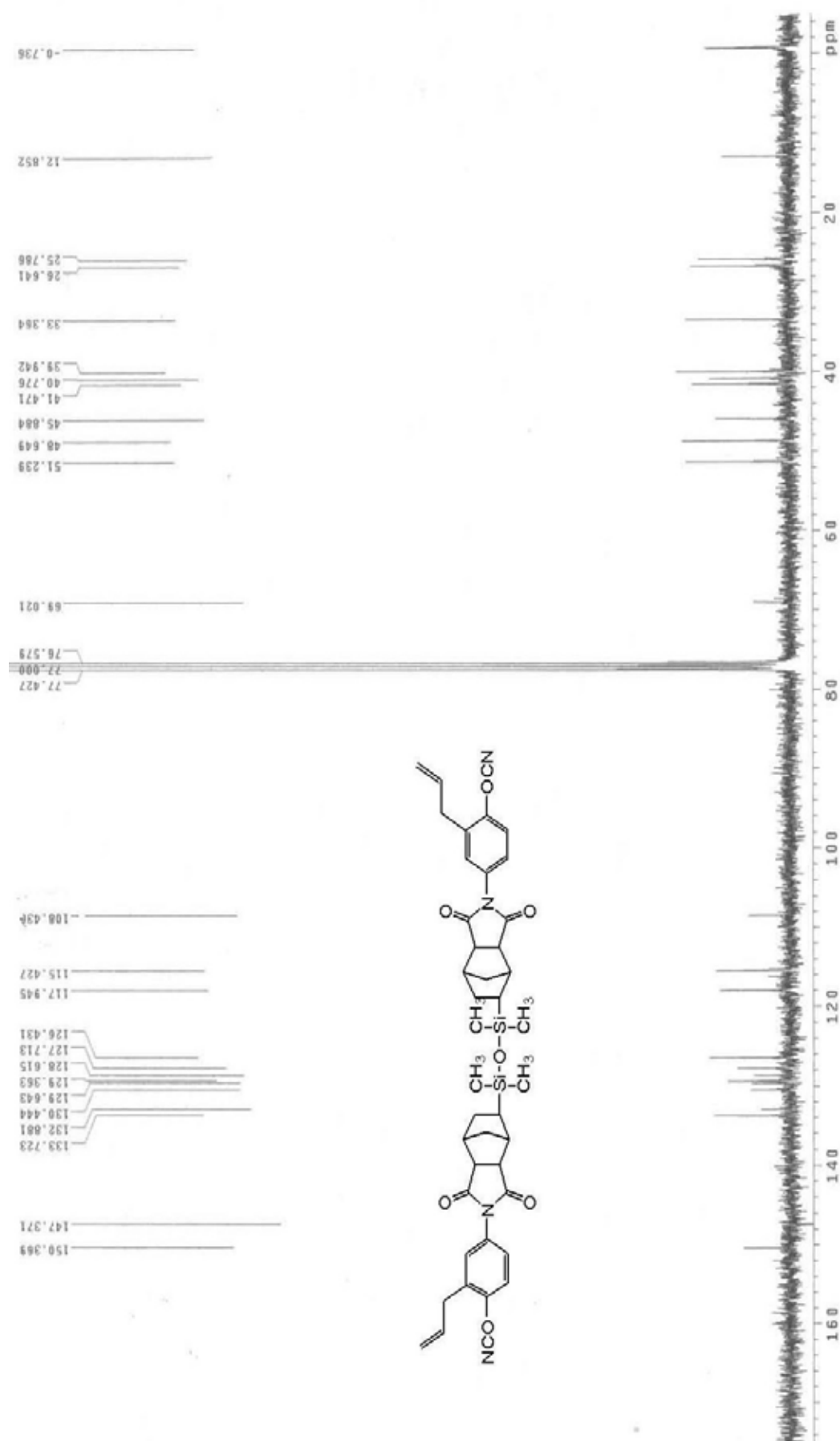


Figure 3-19 ¹³C NMR spectrum of compound V

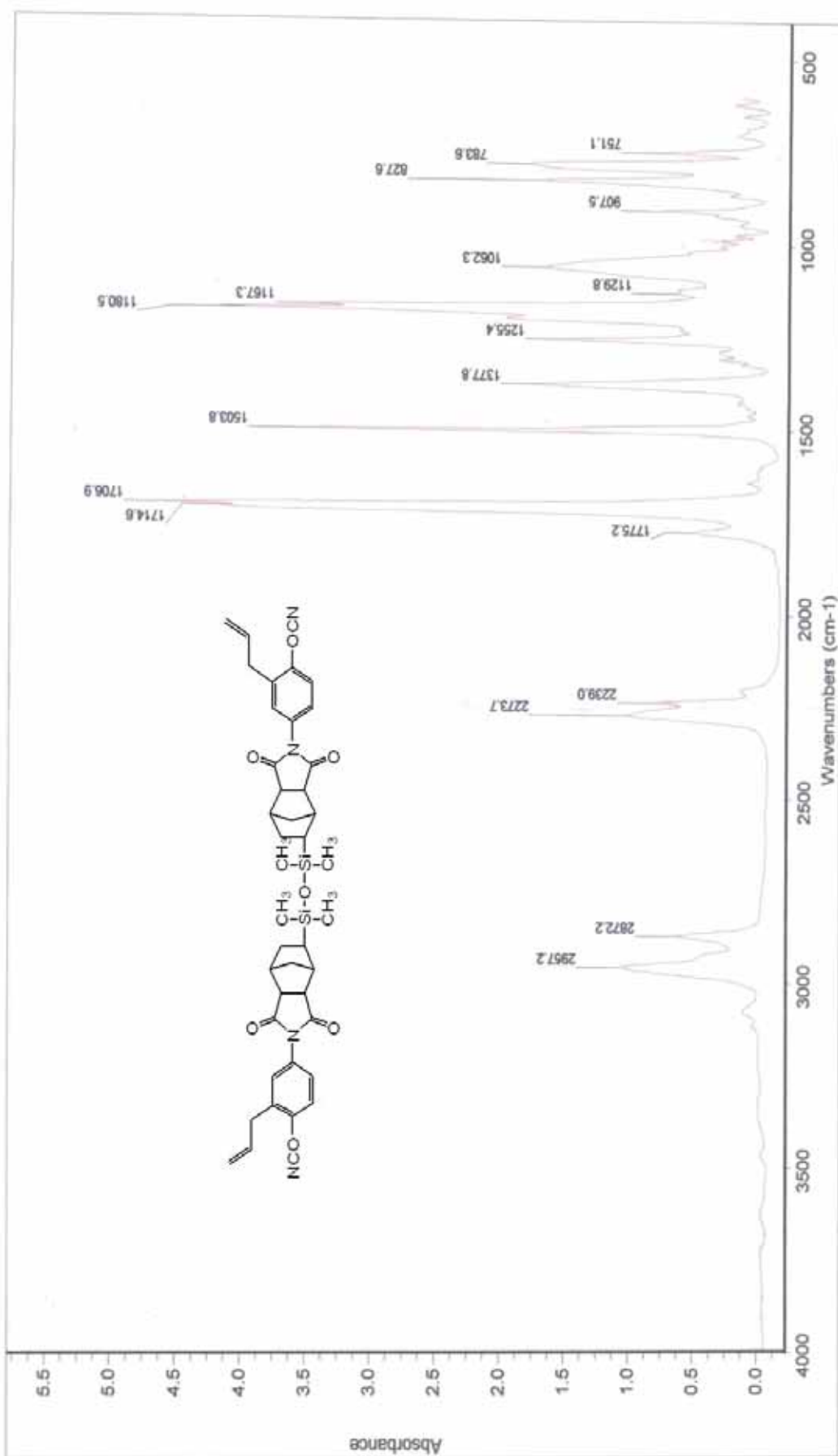


Figure 3-20 FT-IR spectrum of compound V

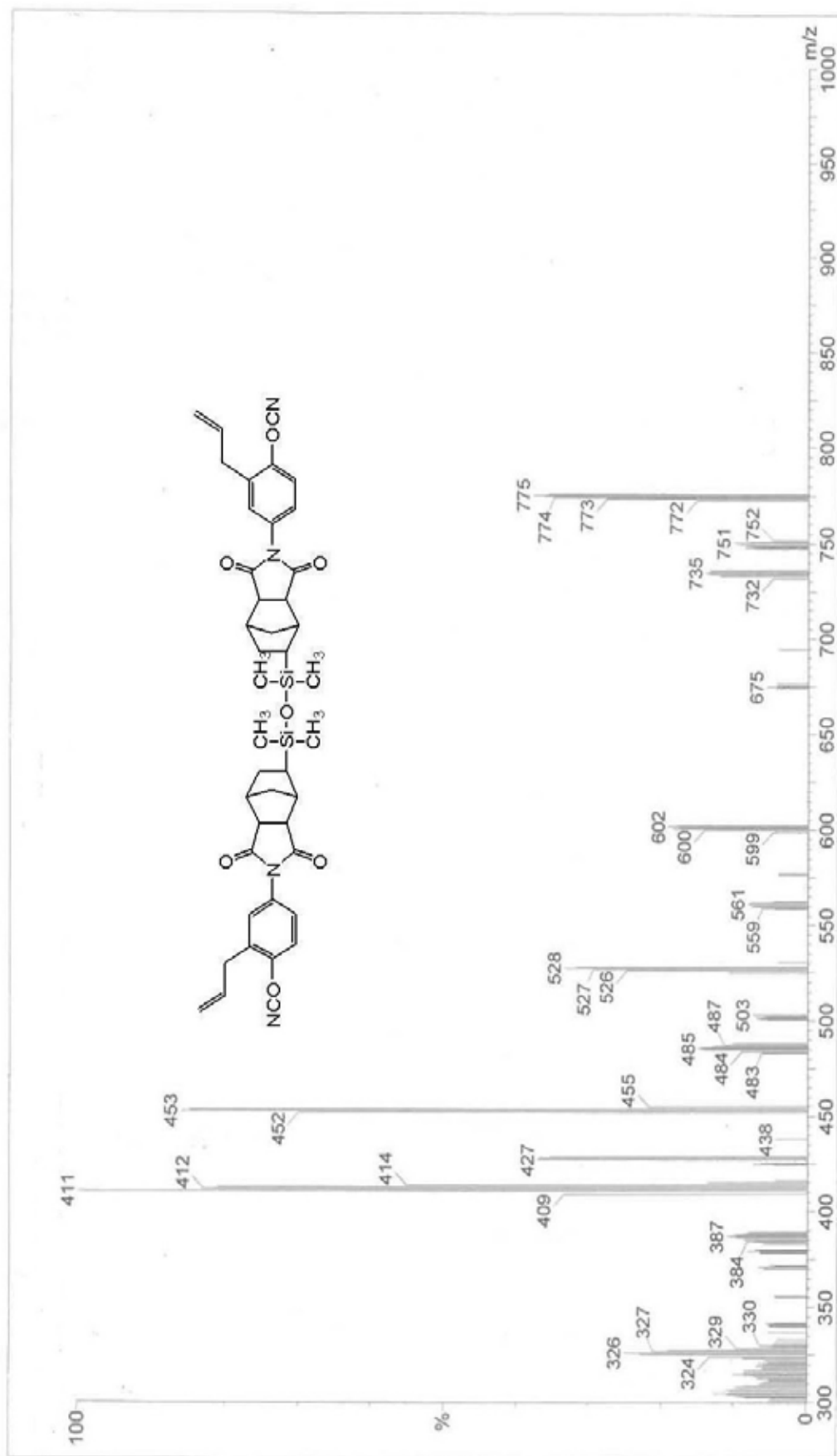


Figure 3-21 MASS spectrum of compound V

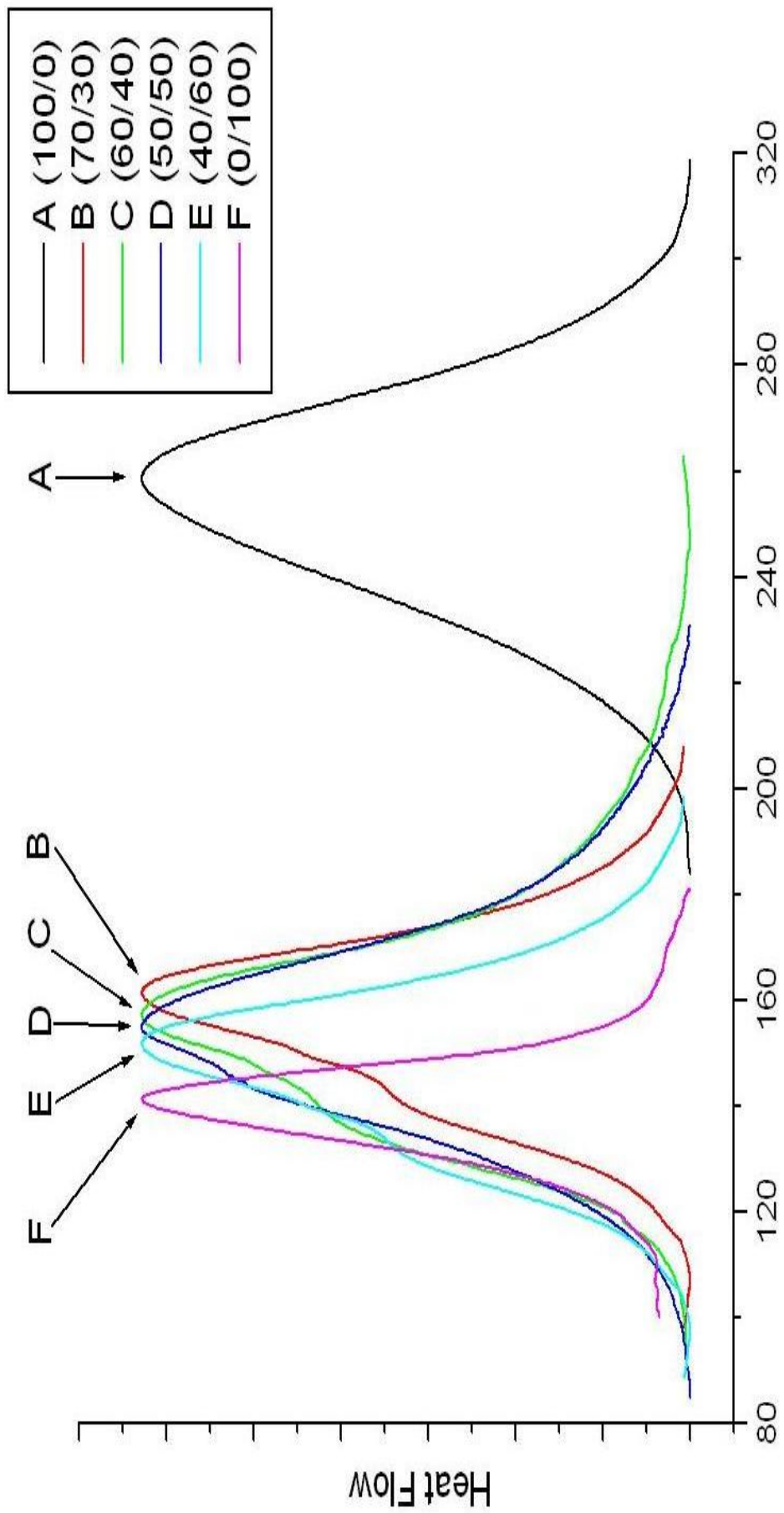


Figure 3-22 Dynamic DSC of sample (GA-240/V) , A=100/0 , B=70/30 , C=60/40 , D=50/50 , E=40/60 , F=0/100

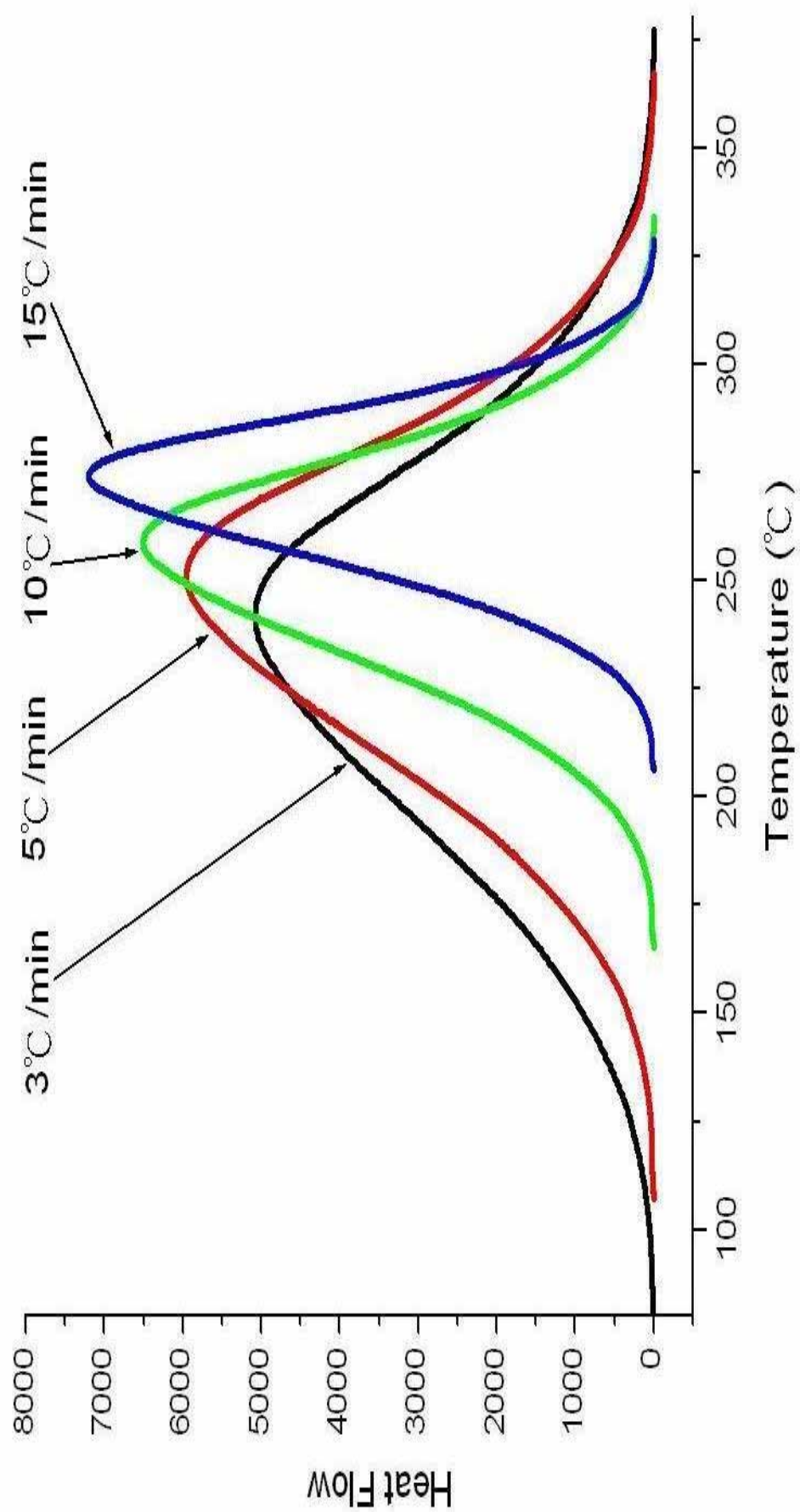


Figure 3-23 Dynamic DSC of sample (GA-240/N=100/0) with different rise temp rate

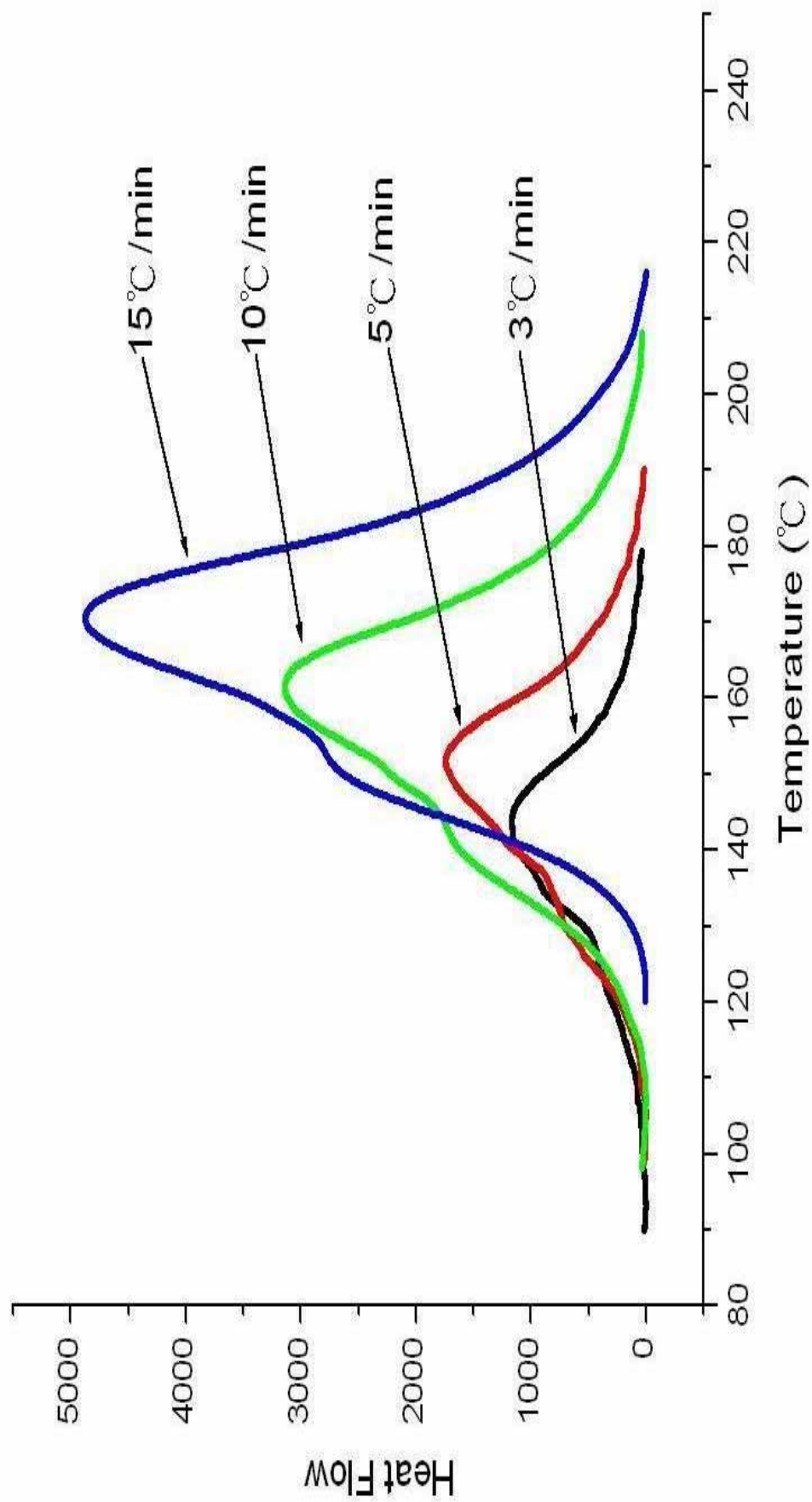


Figure 3-24 Dynamic DSC of sample (GA-240/V=70/30) with different rise temp rate

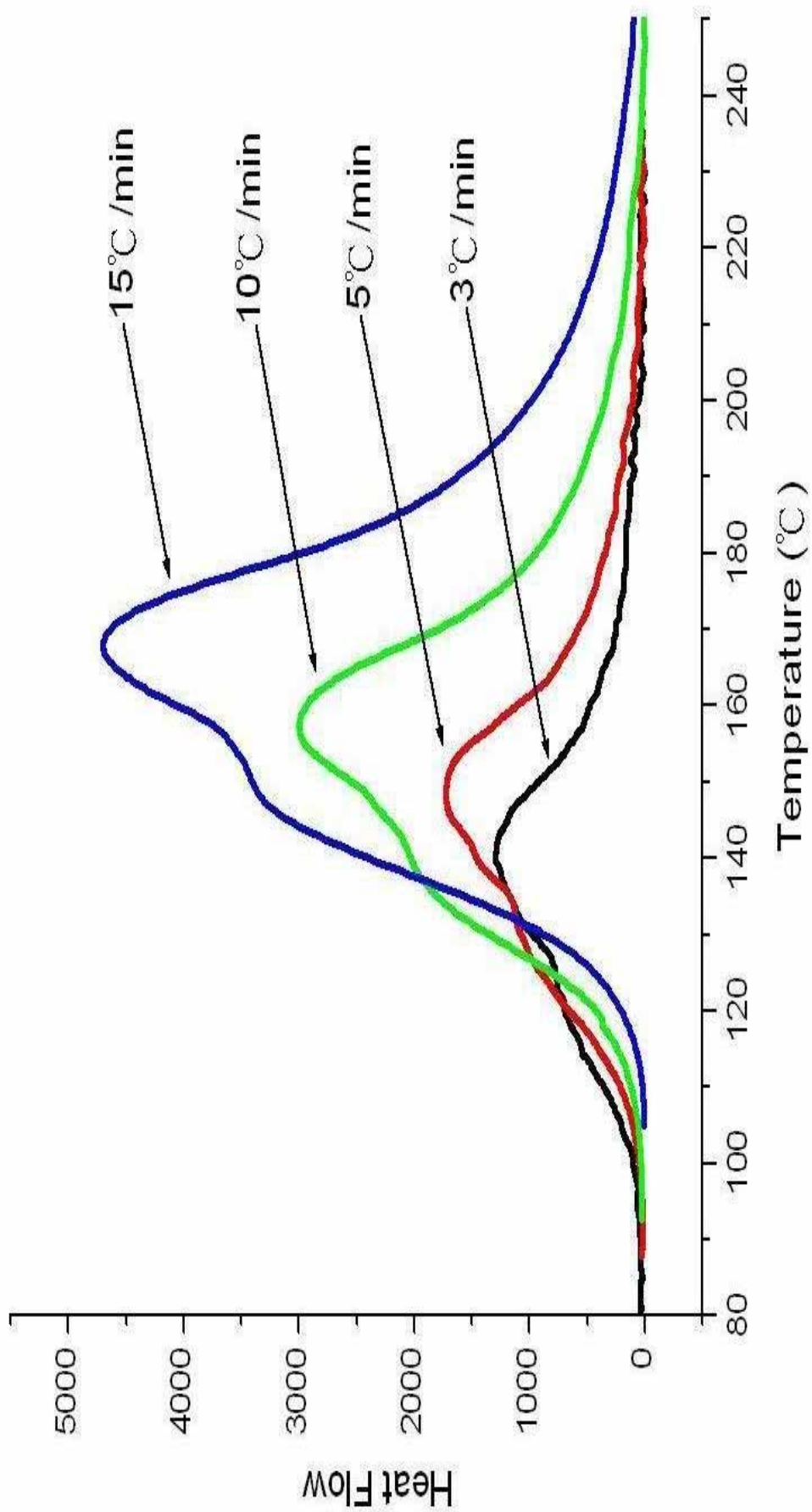


Figure 3-25 Dynamic DSC of sample (GA-240/V=60/40) with different rise temp rate

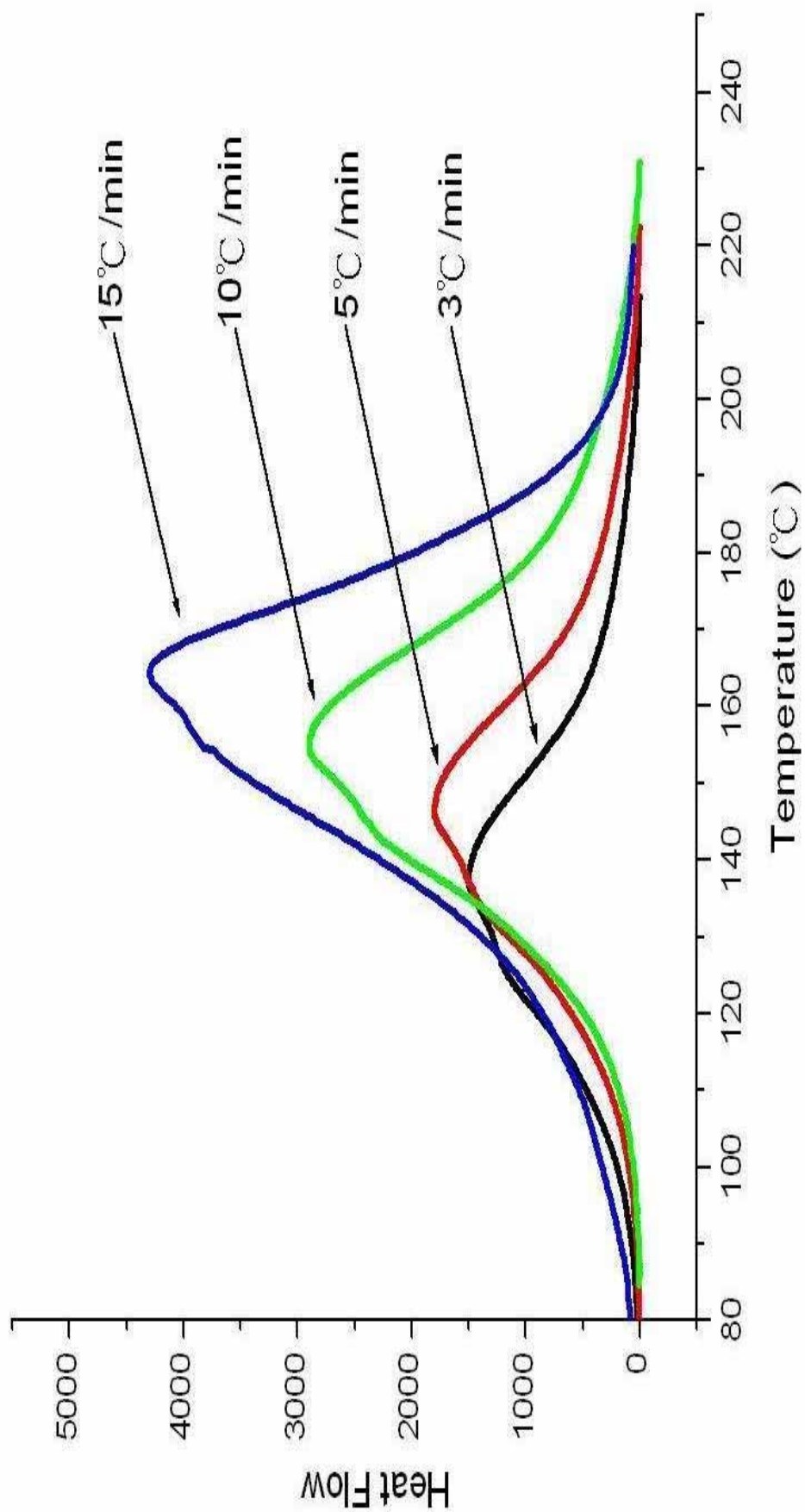


Figure 3-26 Dynamic DSC of sample (GA-240/V=50/50) with different rise temp rate

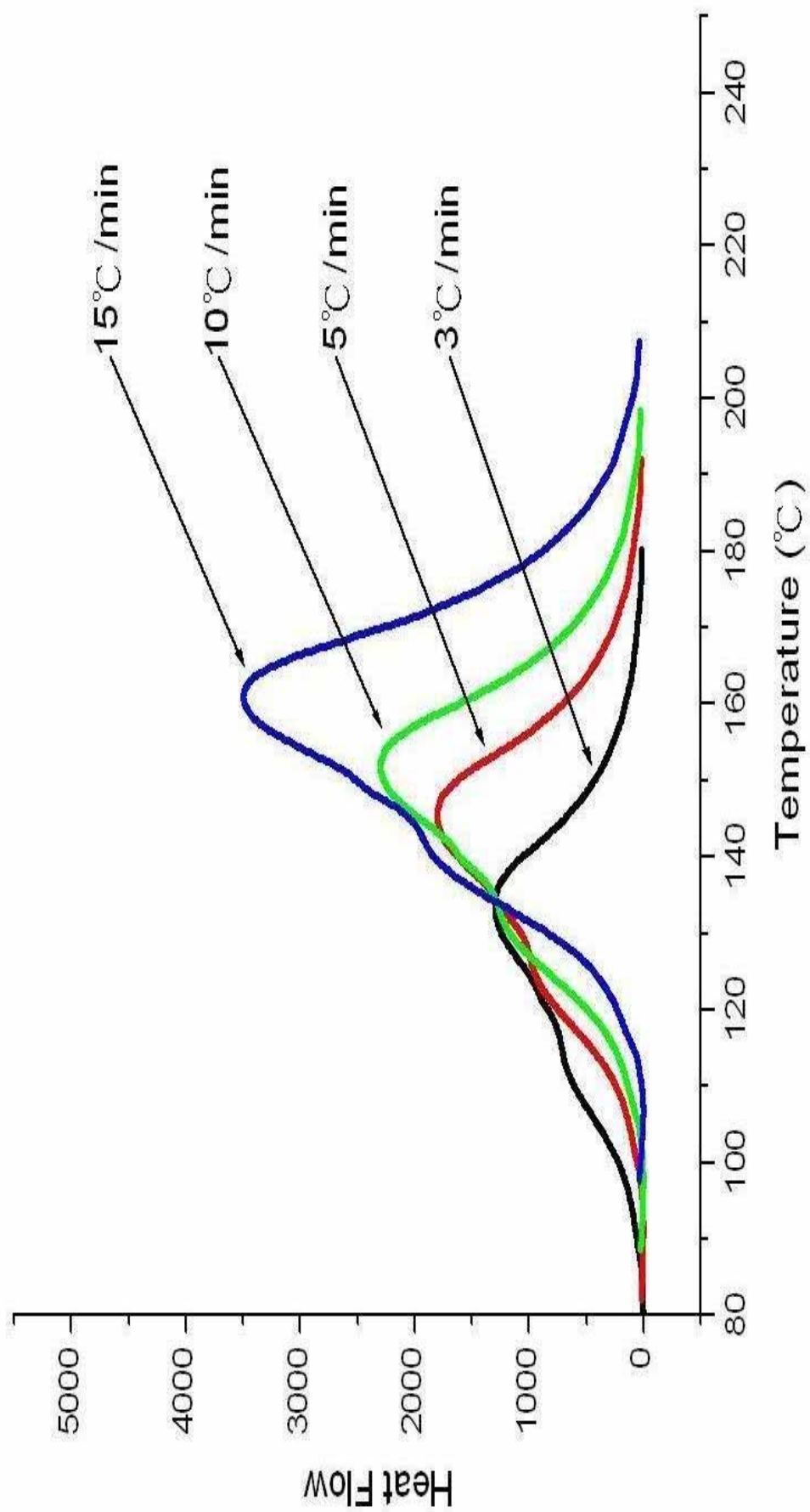


Figure 3-27 Dynamic DSC of sample (GA-240/V=40/60) with different rise temp rate

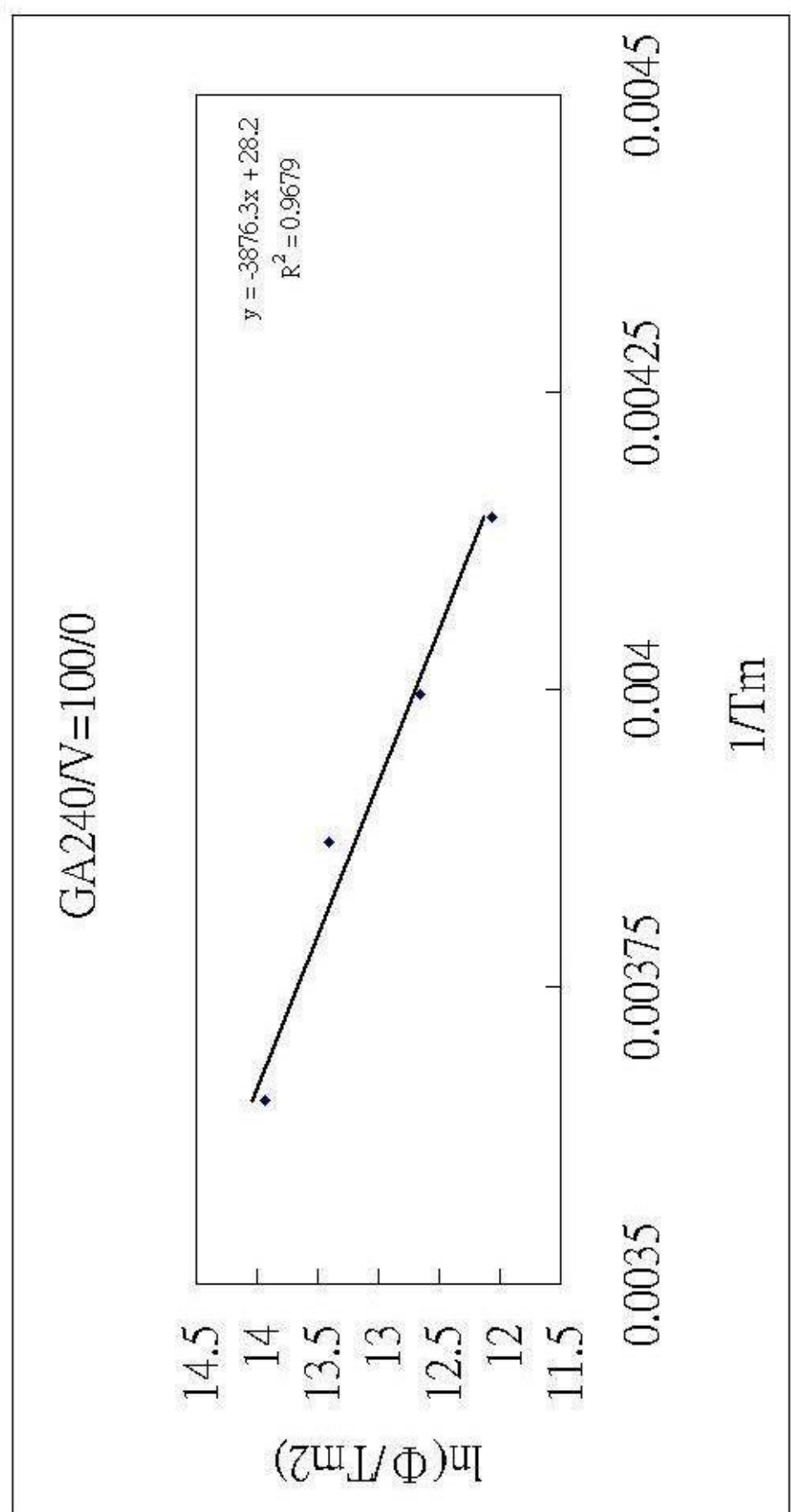


Figure 3-28 $\ln(\Phi/T_m^2)$ VS $1/T_m$ of sample (GA-240/V=100/0)

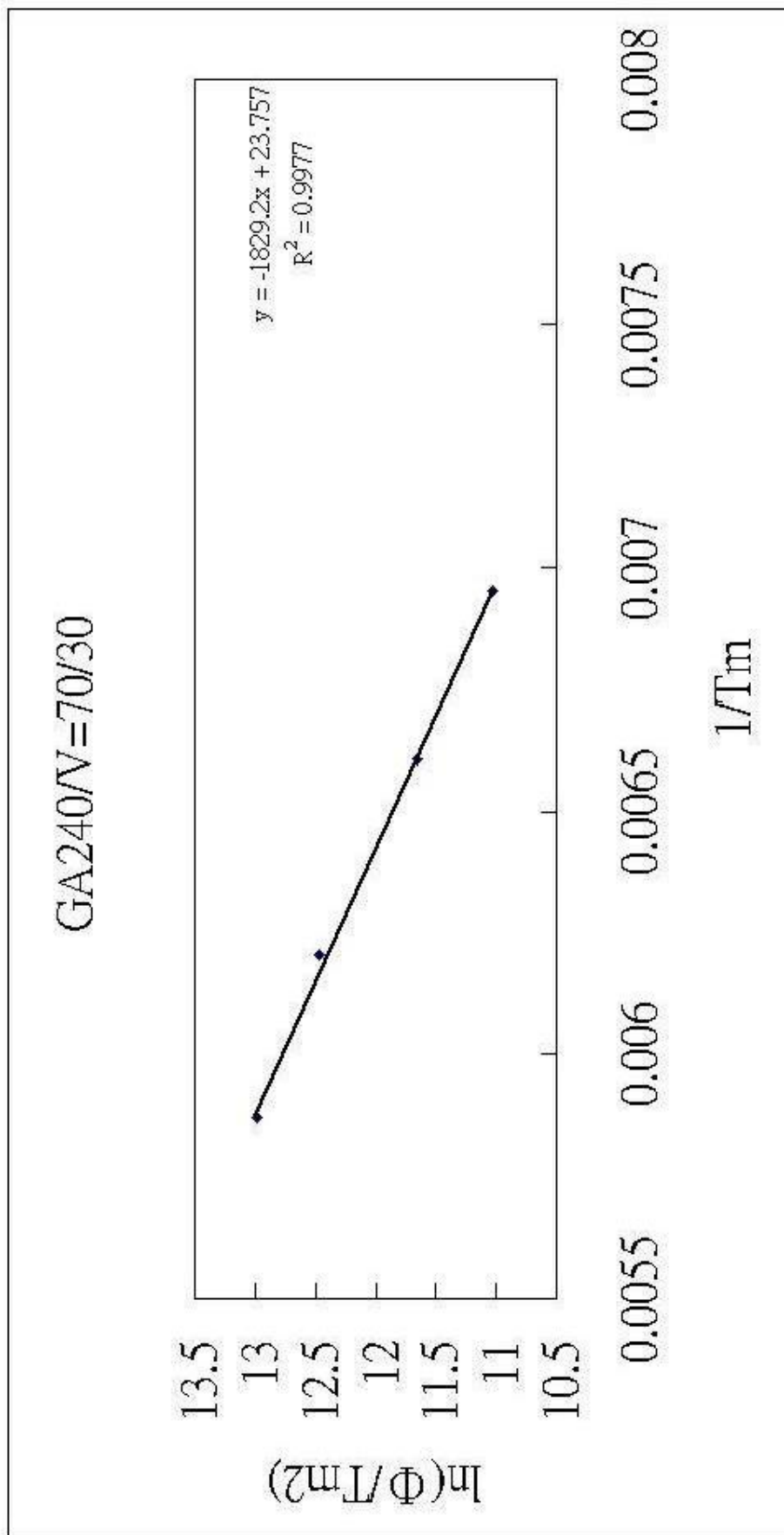


Figure 3-29 $\ln(\Phi/T_m^2)$ VS $1/T_m$ of sample (GA-240/V=70/30)

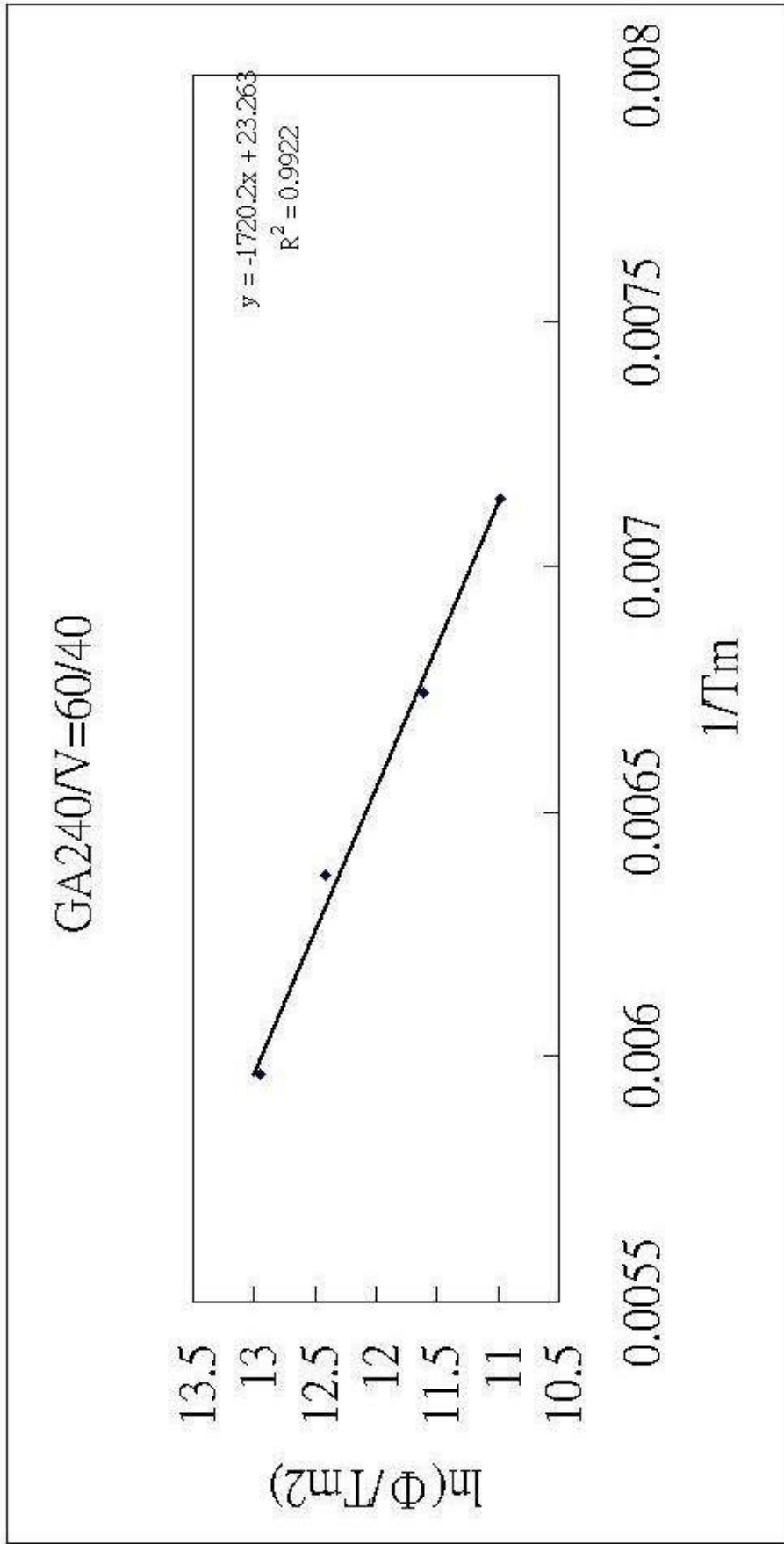


Figure 3-30 $\ln(\Phi/T_m^2)$ VS $1/T_m$ of sample (GA-240/V=60/40)

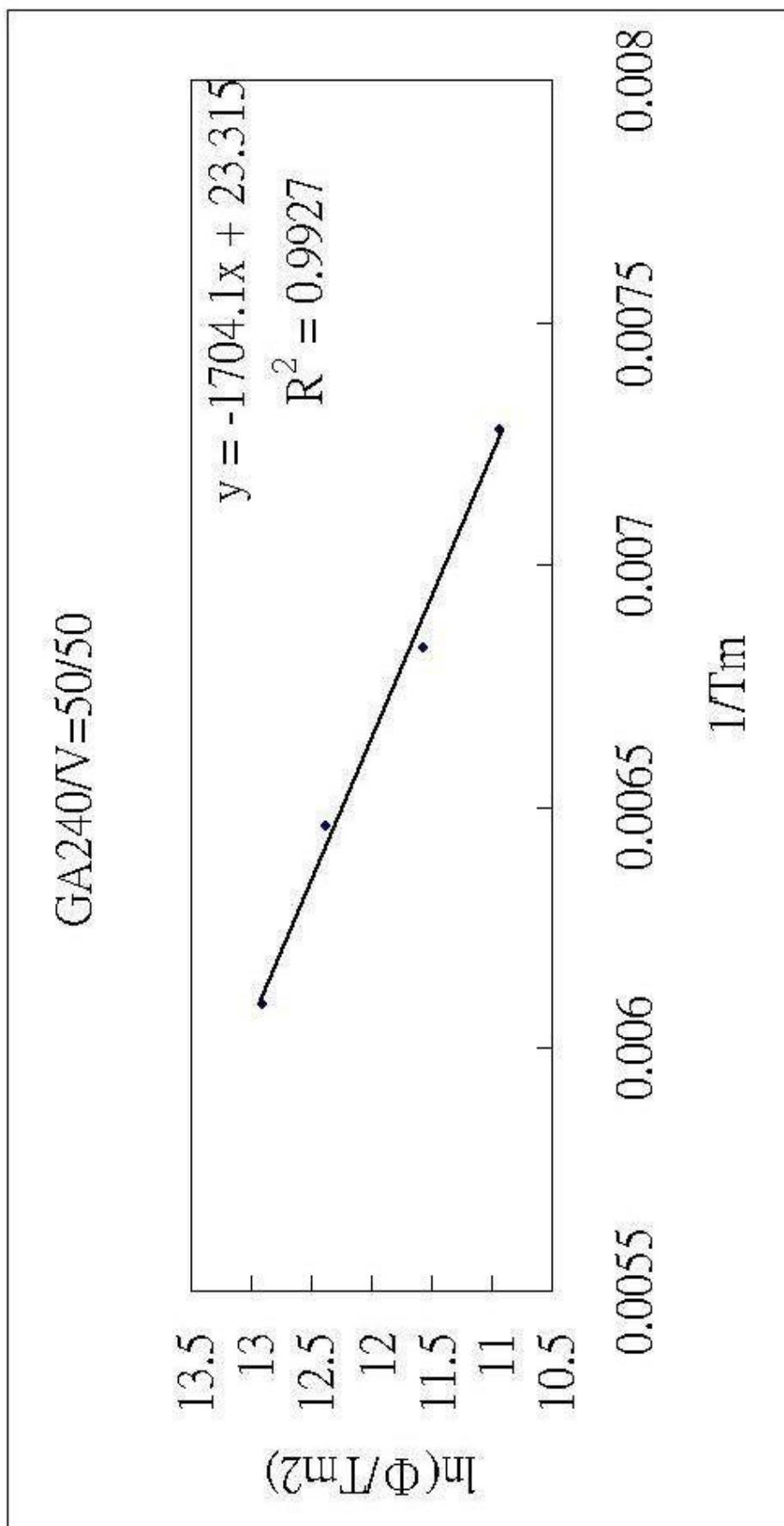


Figure 3-31 $\ln(\Phi/T_m^2)$ VS $1/T_m$ of sample (GA-240/V=50/50)

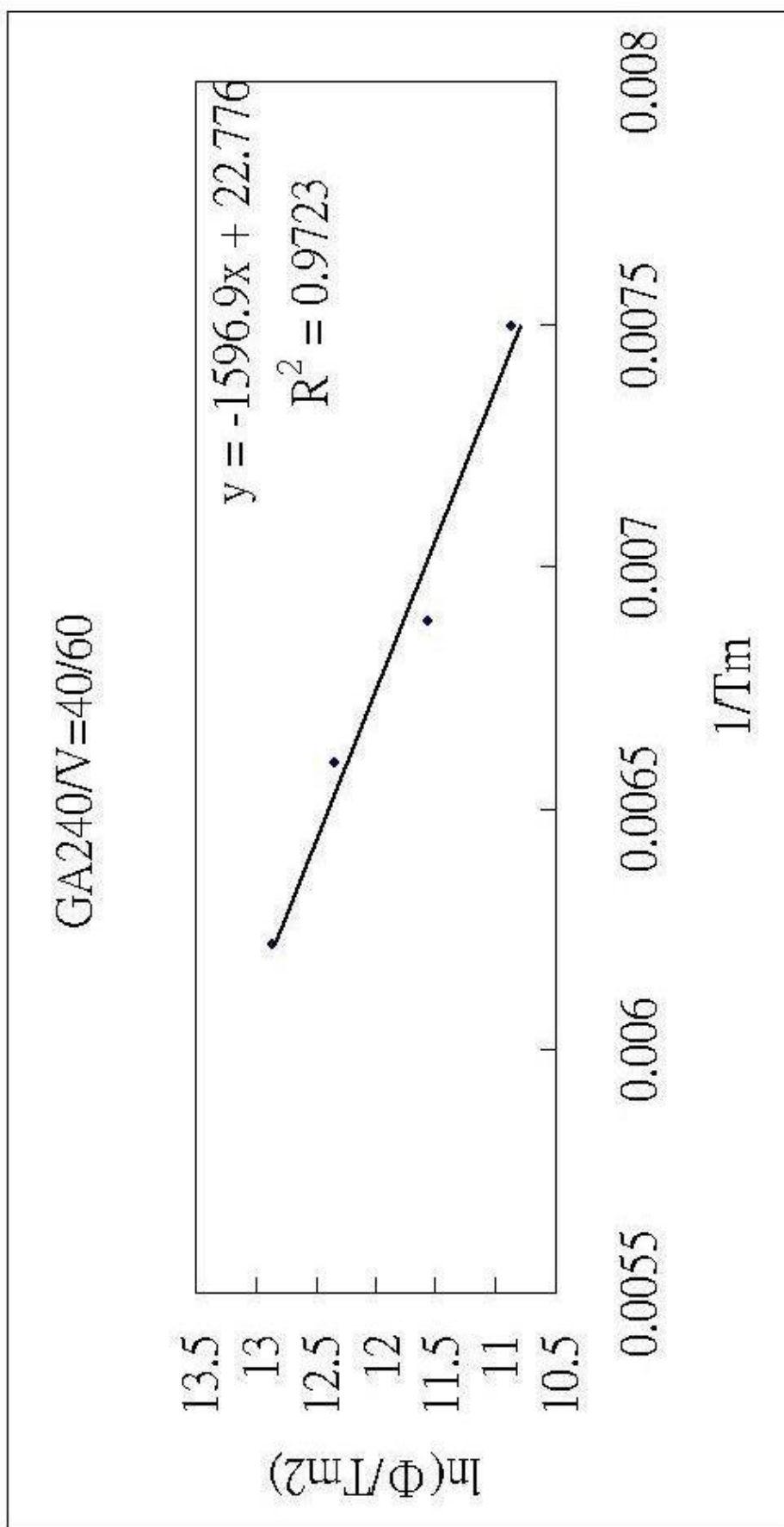


Figure 3-32 $\ln(\Phi/T_m^2)$ VS $1/T_m$ of sample (GA-240/V=40/60)

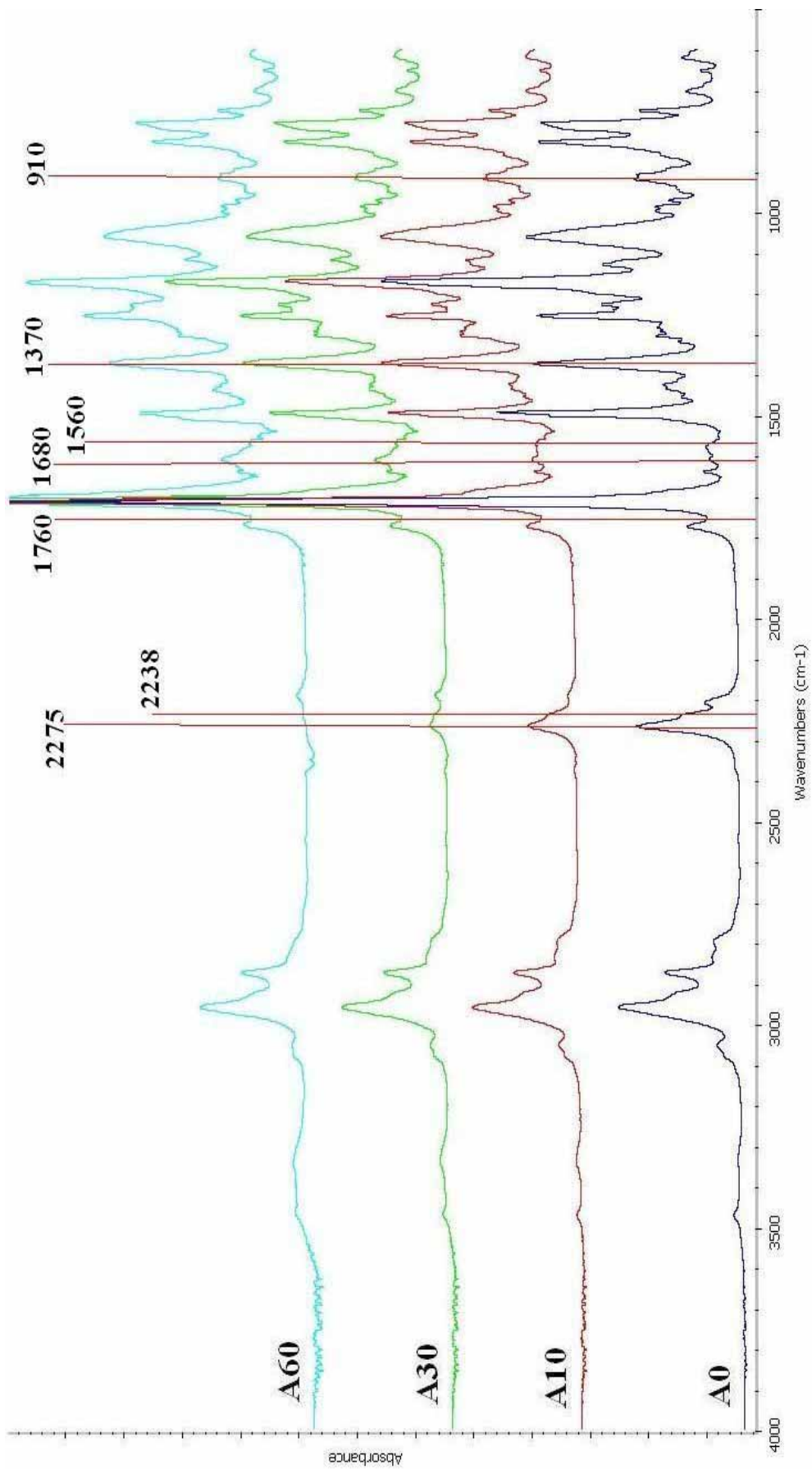


Figure 3-33 FT-IR spectra of sample (GA-240/V=50/50) cured at 130 °C for different curing times (At , t in minutes) in the range of 600-4000 cm⁻¹

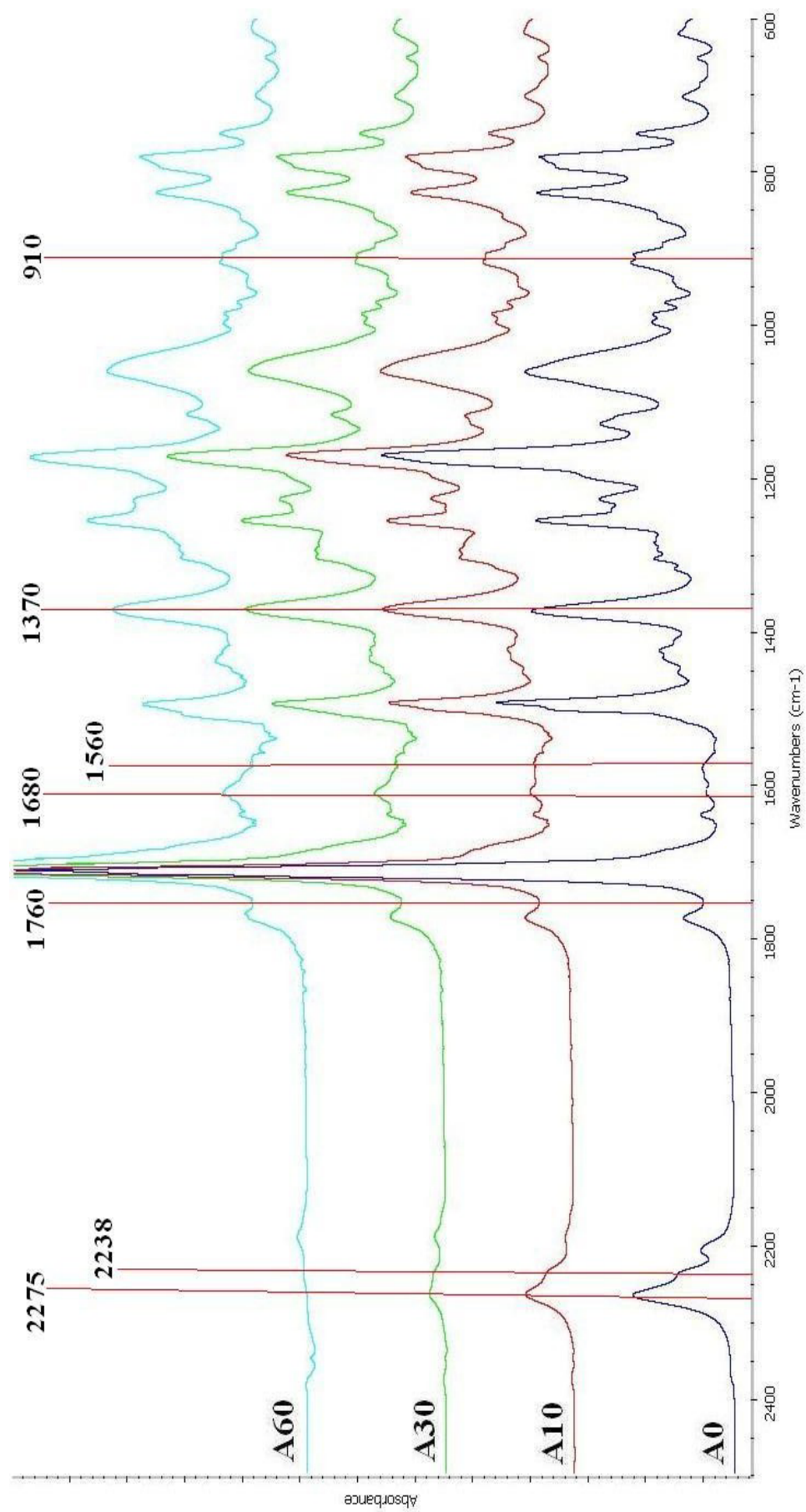


Figure 3-34 FT-IR spectra of sample (GA-240/V=50/50) cured at 130 °C for different curing times (A_t, t in minutes) in the range of 600-2400 cm⁻¹

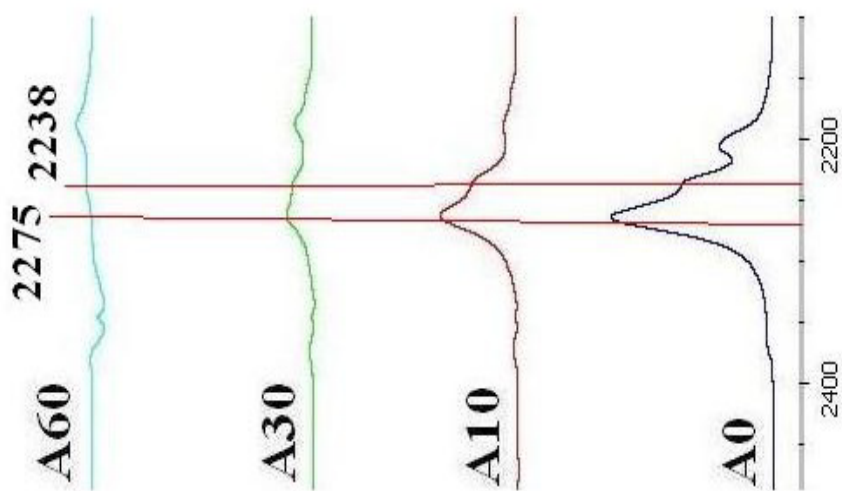


Figure 3-35 FT-IR spectra of sample (GA-240/V=50/50) cured at 130°C for different curing times (A_t, t in minutes) in the range of 2100-2500 cm^{-1}

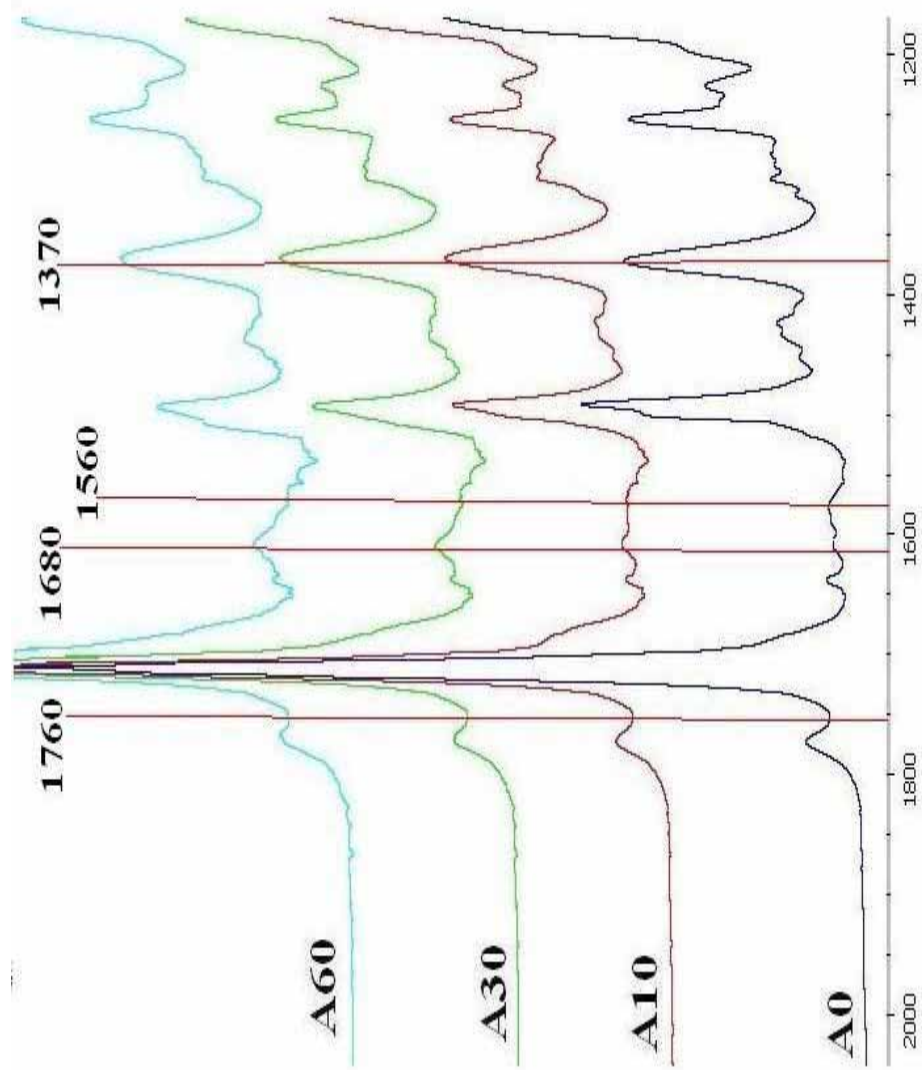


Figure 3-36 FT-IR spectra of sample (GA-240/V=50/50) cured at 130 °C for different curing times (At , t in minutes) in the range of 1200-2000 cm^{-1}

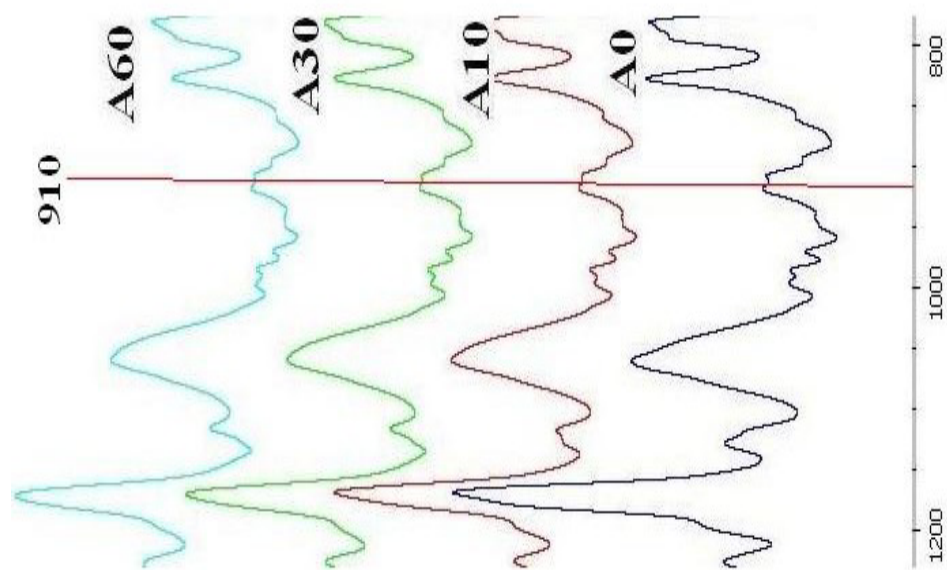


Figure 3-37 FT-IR spectra of sample (GA-240/V=50/50) cured at 130°C for different curing times (At, t in minutes) in the range of 800-1200 cm^{-1}

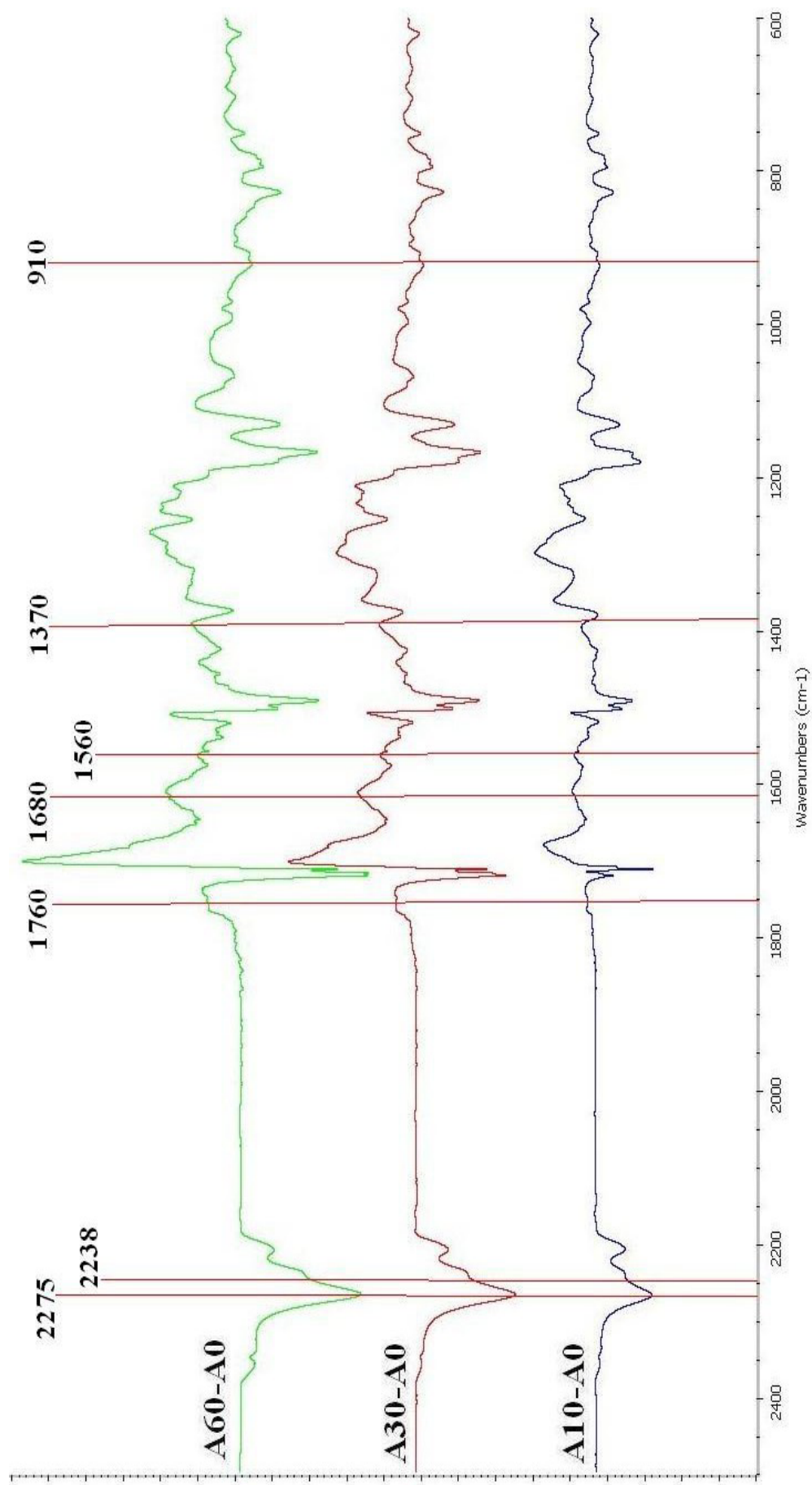


Figure 3-38 Difference FT-IR spectra (At-A0 , t in minutes) of sample (GA-240/V=50/50) cured at 130 °C

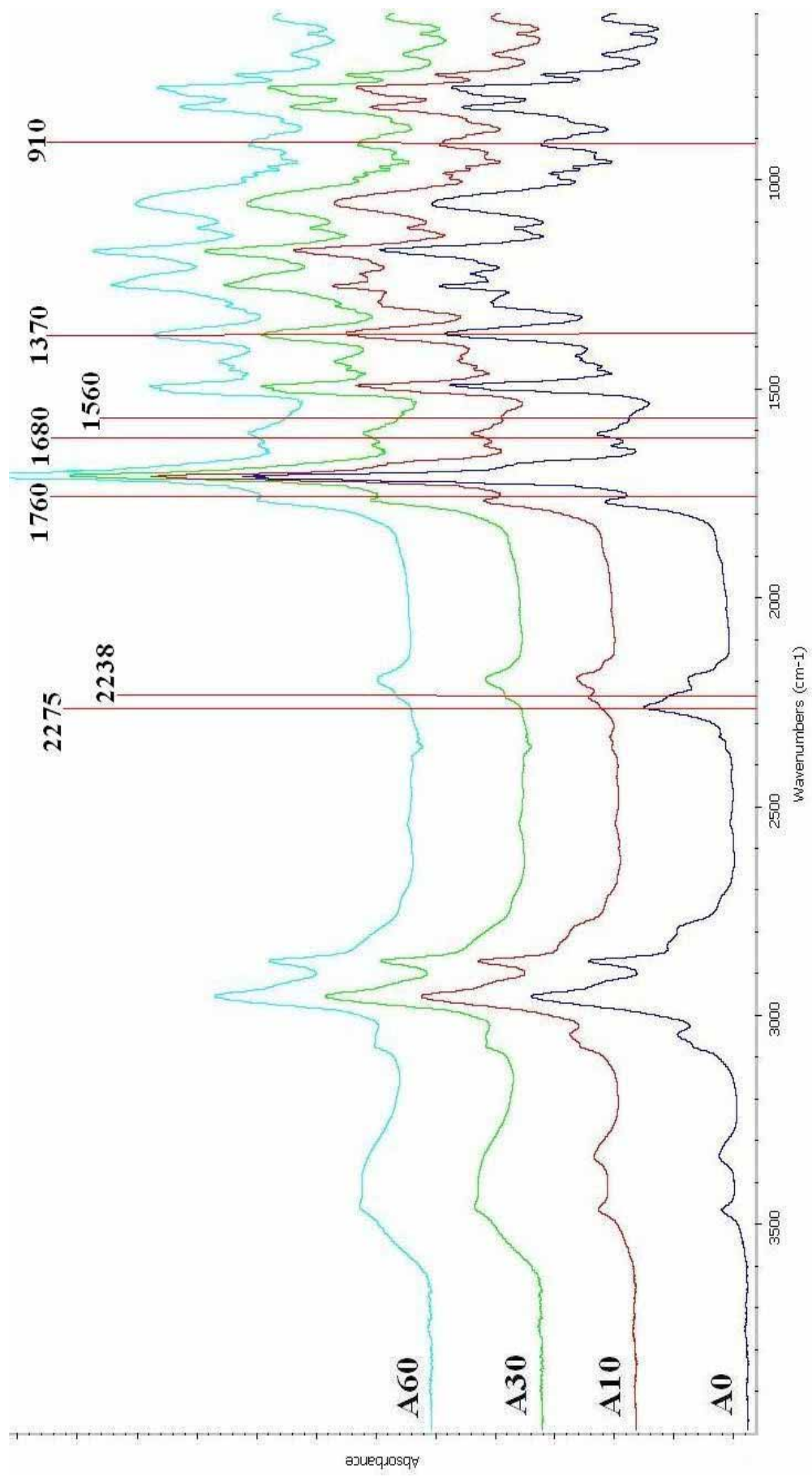


Figure 3-39 FT-IR spectra of sample (GA-240/N=50/50) cured at 190°C for different curing times (At, t in minutes) in the range of 600-4000 cm⁻¹

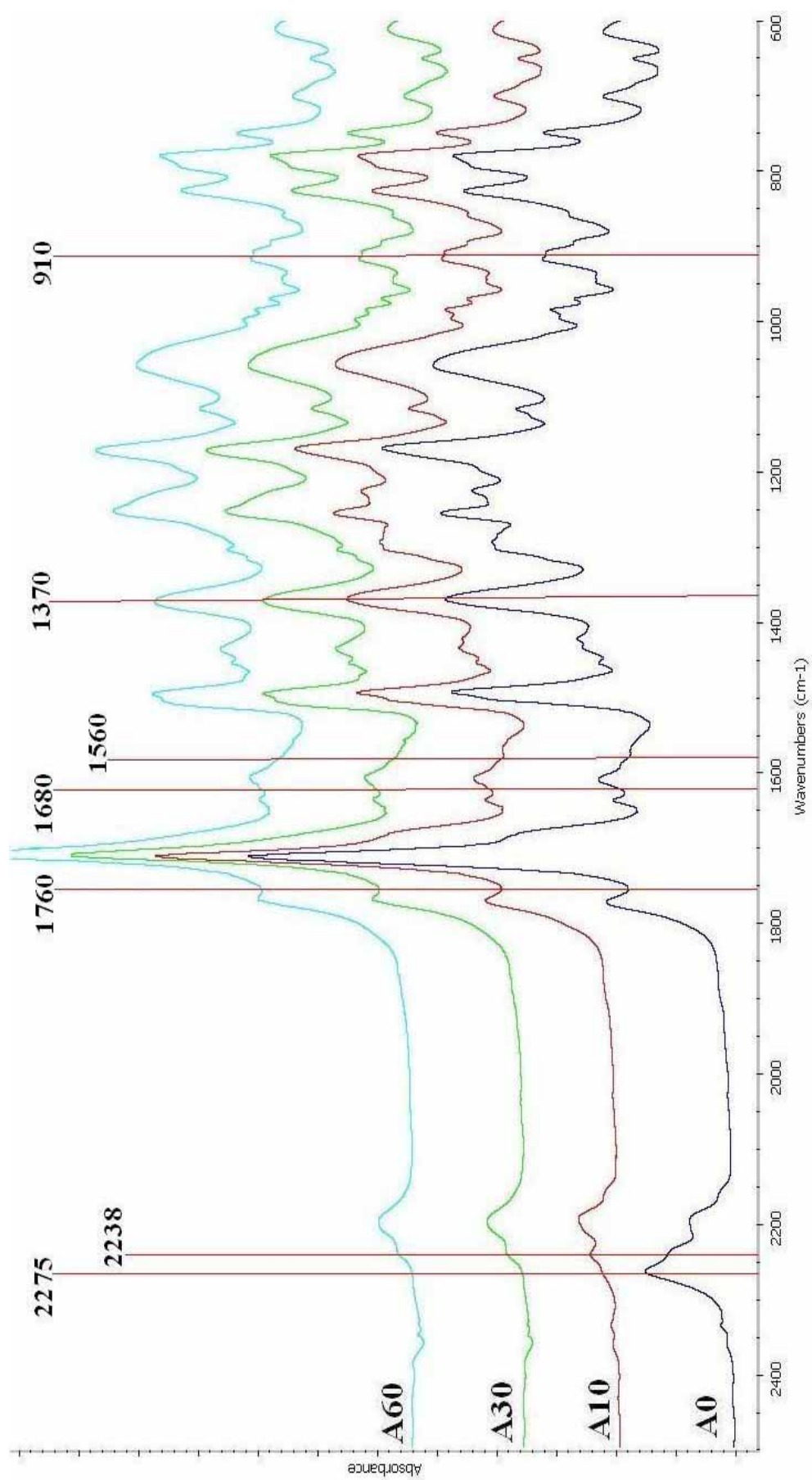


Figure 3-40 FT-IR spectra of sample (GA-240/V=50/50) cured at 190 °C for different curing times (At , t in minutes) in the range of 600-2400 cm⁻¹

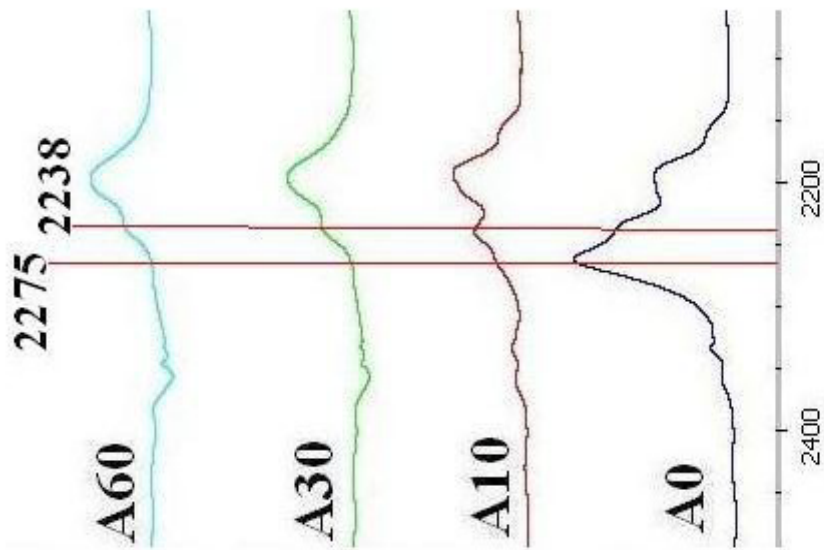


Figure 3-41 FT-IR spectra of sample (GA-240/V=50/50) cured at 190°C for different curing times (At, t in minutes) in the range of 2100-2500 cm^{-1}

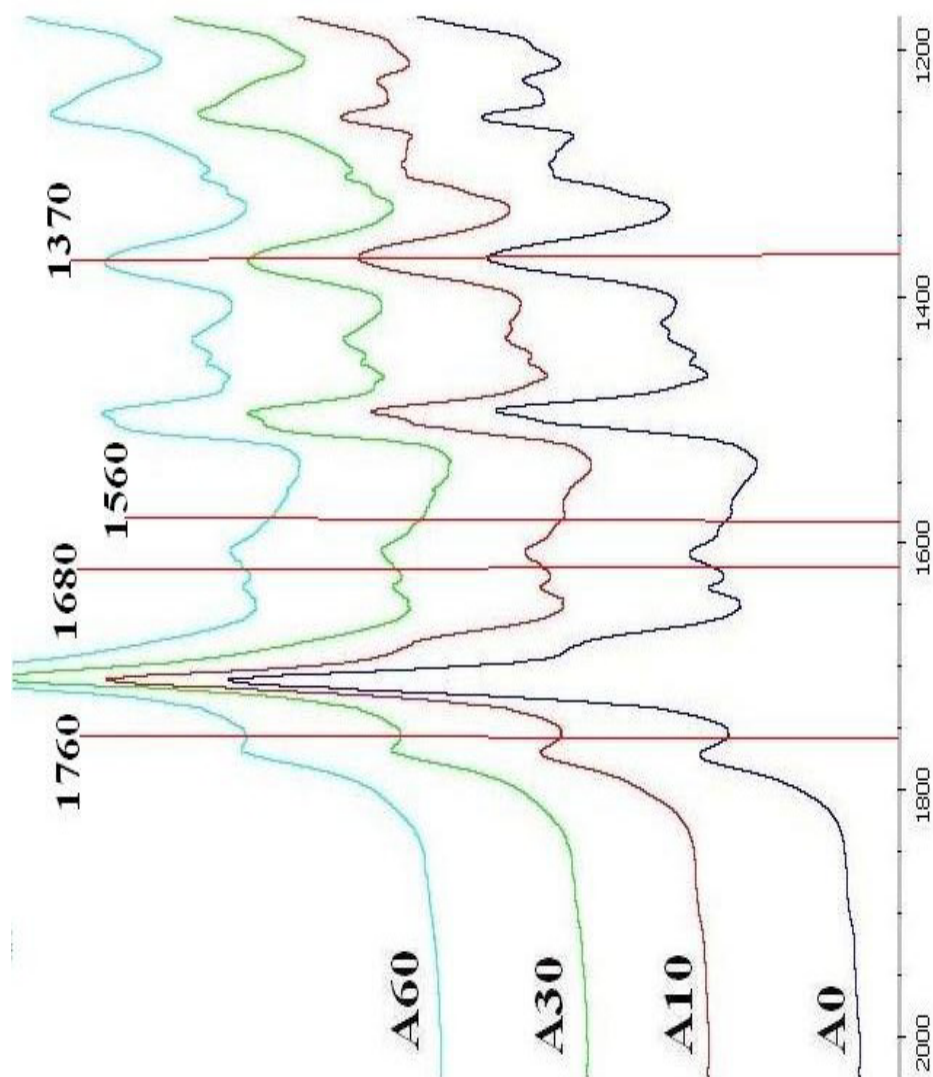


Figure 3-42 FT-IR spectra of sample (GA-240/V=50/50) cured at 190°C for different curing times (A_t, t in minutes) in the range of 1200-2000 cm^{-1}

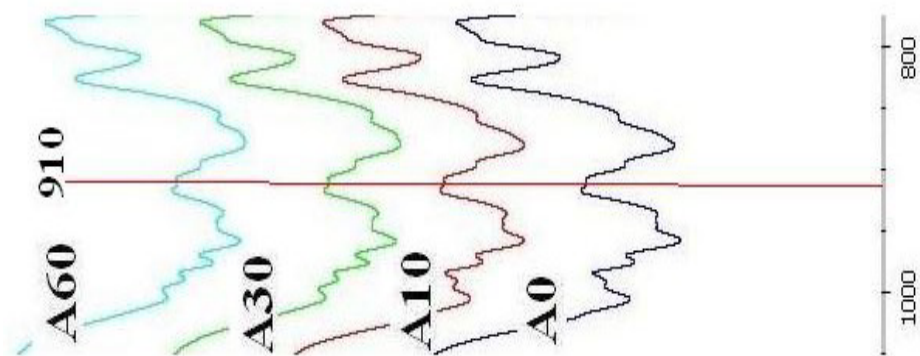


Figure 3-43 FT-IR spectra of sample (GA-240/V=50/50) cured at 190°C for different curing times (A_t, t in minutes) in the range of 800-1000 cm⁻¹

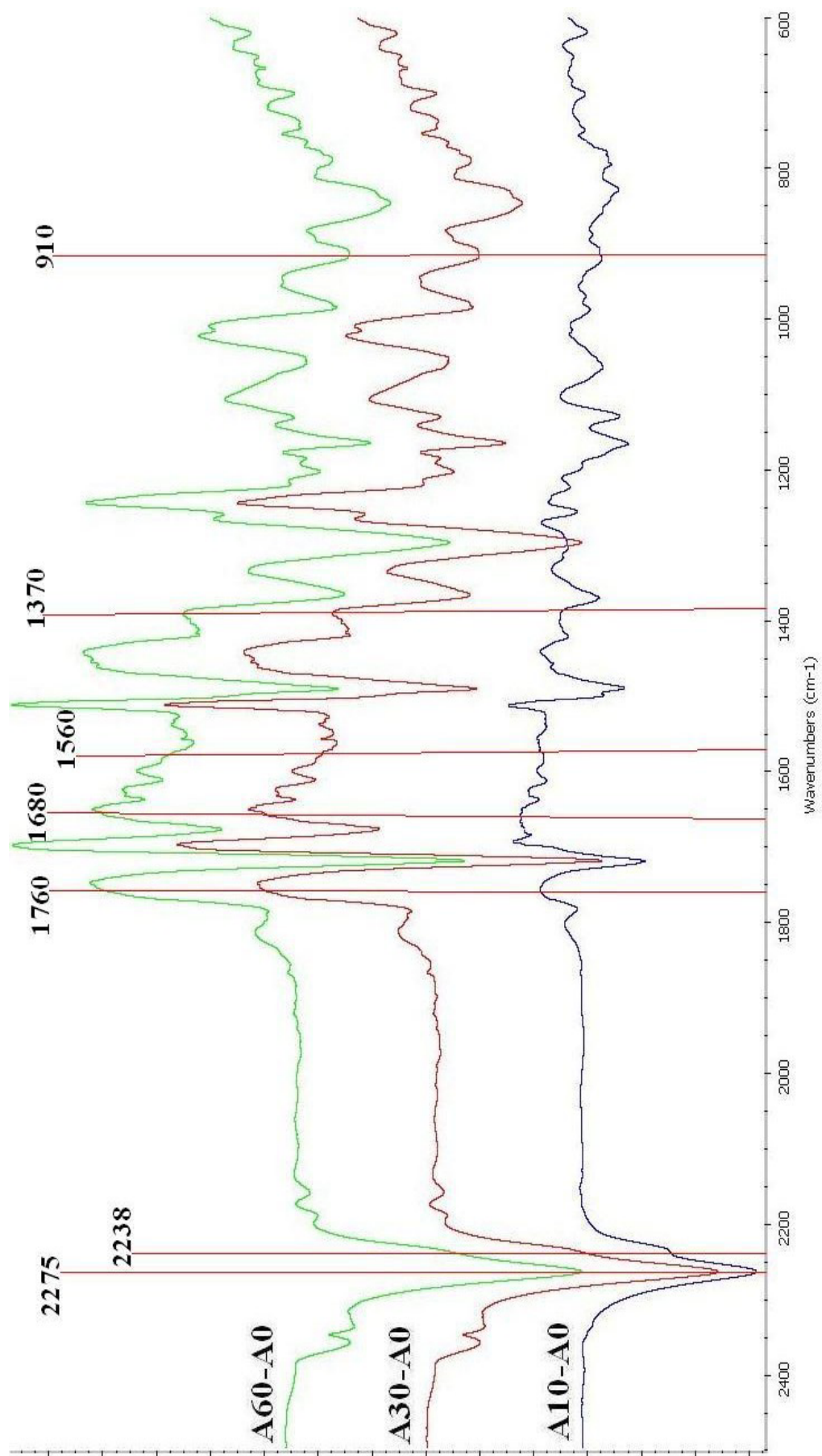
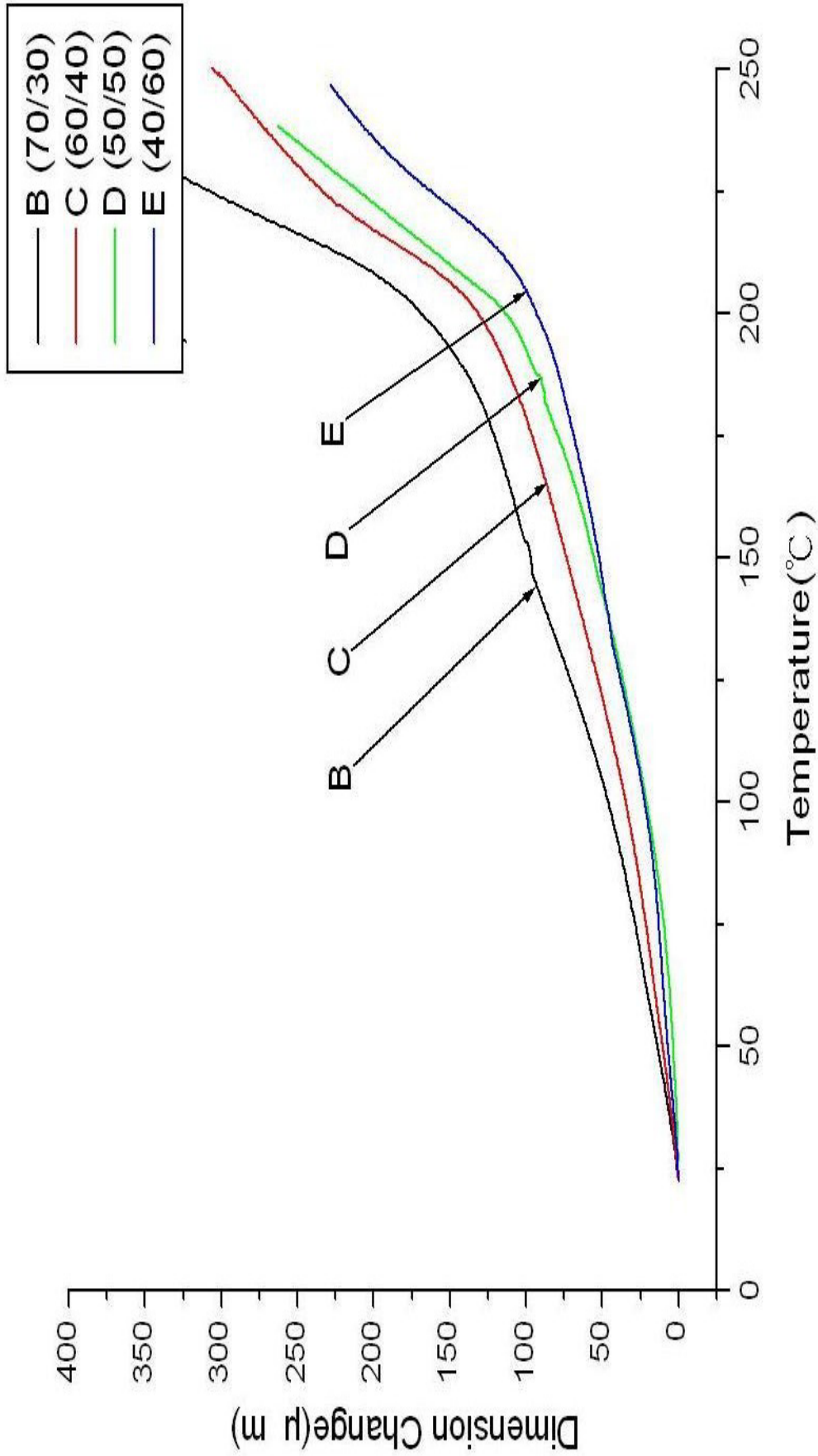


Figure 3-44 Difference FT-IR spectra (At-A0 , t in minutes) of sample (GA-240/V=50/50) cured at 190°C



**Figure 3-45 Thermomechanical analyses of samples (GA-240/V) ,
 B=70/30 , C=60/40 , D=50/50 , E=40/60**

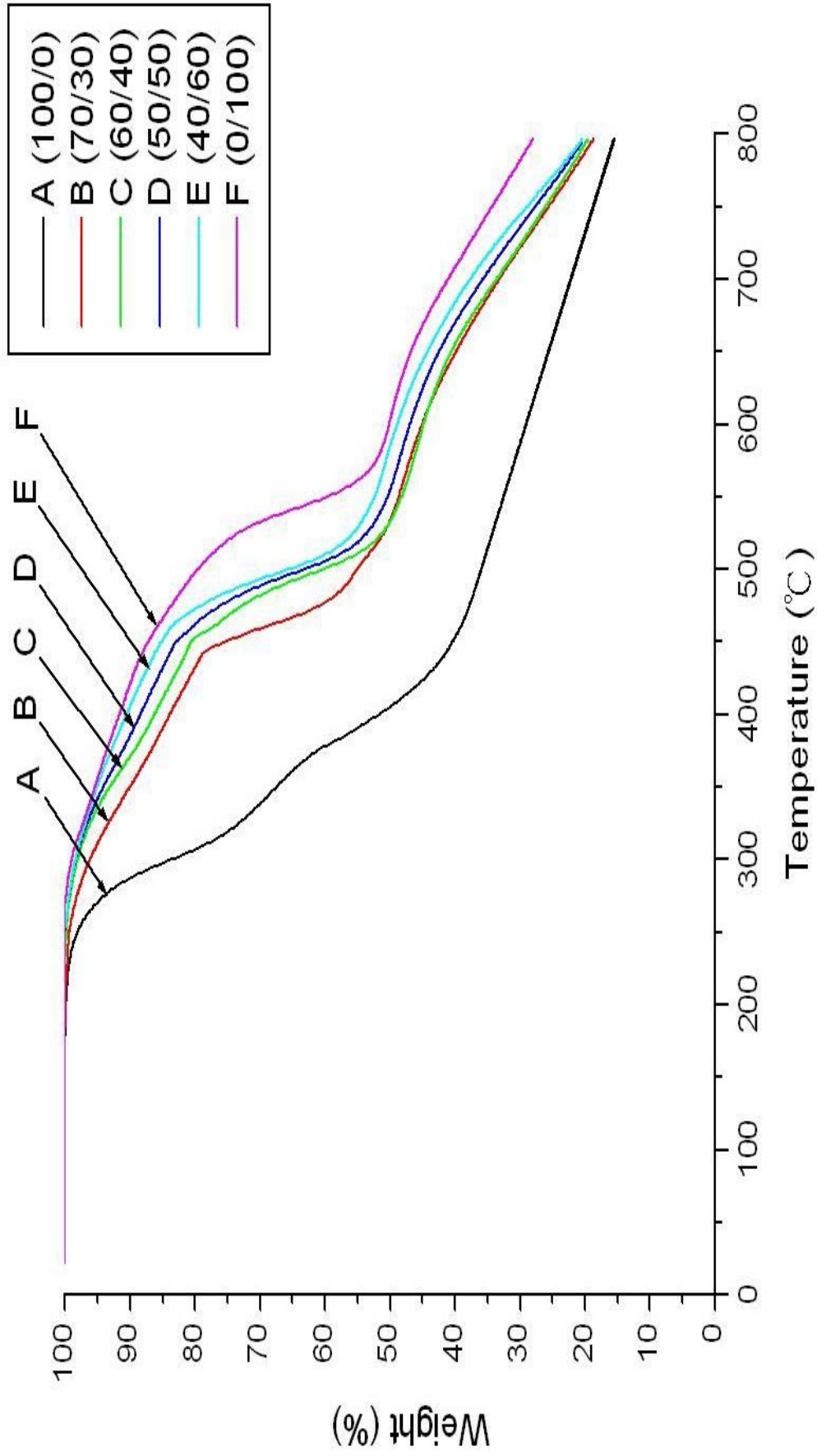


Figure 3-46 Thermogravimetric analyses of samples (GA-240/V)

A=100/0 , B=70/30 , C=60/40 , D=50/50 , E=40/60 , F=0/100