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APPENDICES

APPENDIX A

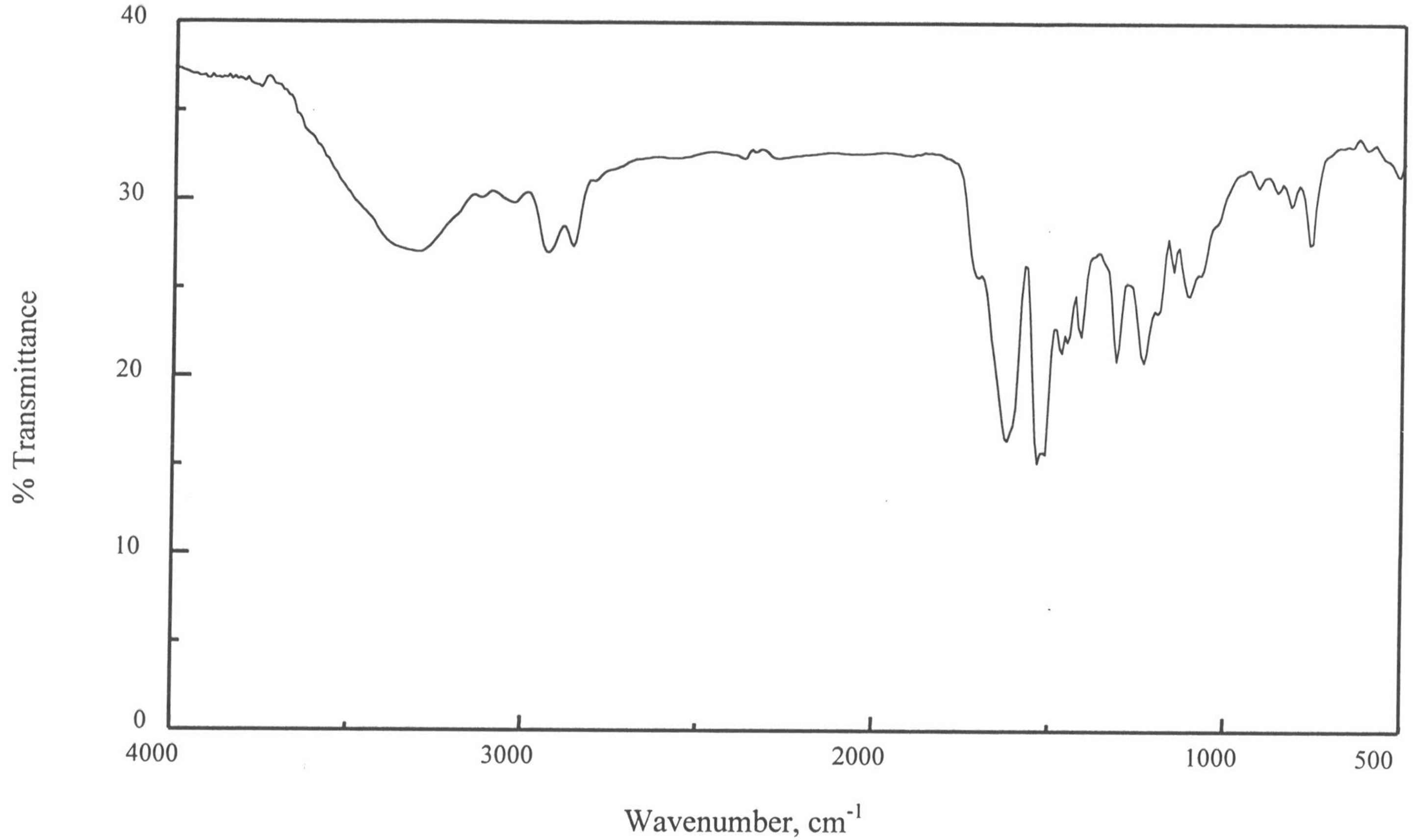

Figure A.1 IR spectrum of PB900-Zn-MDI-50

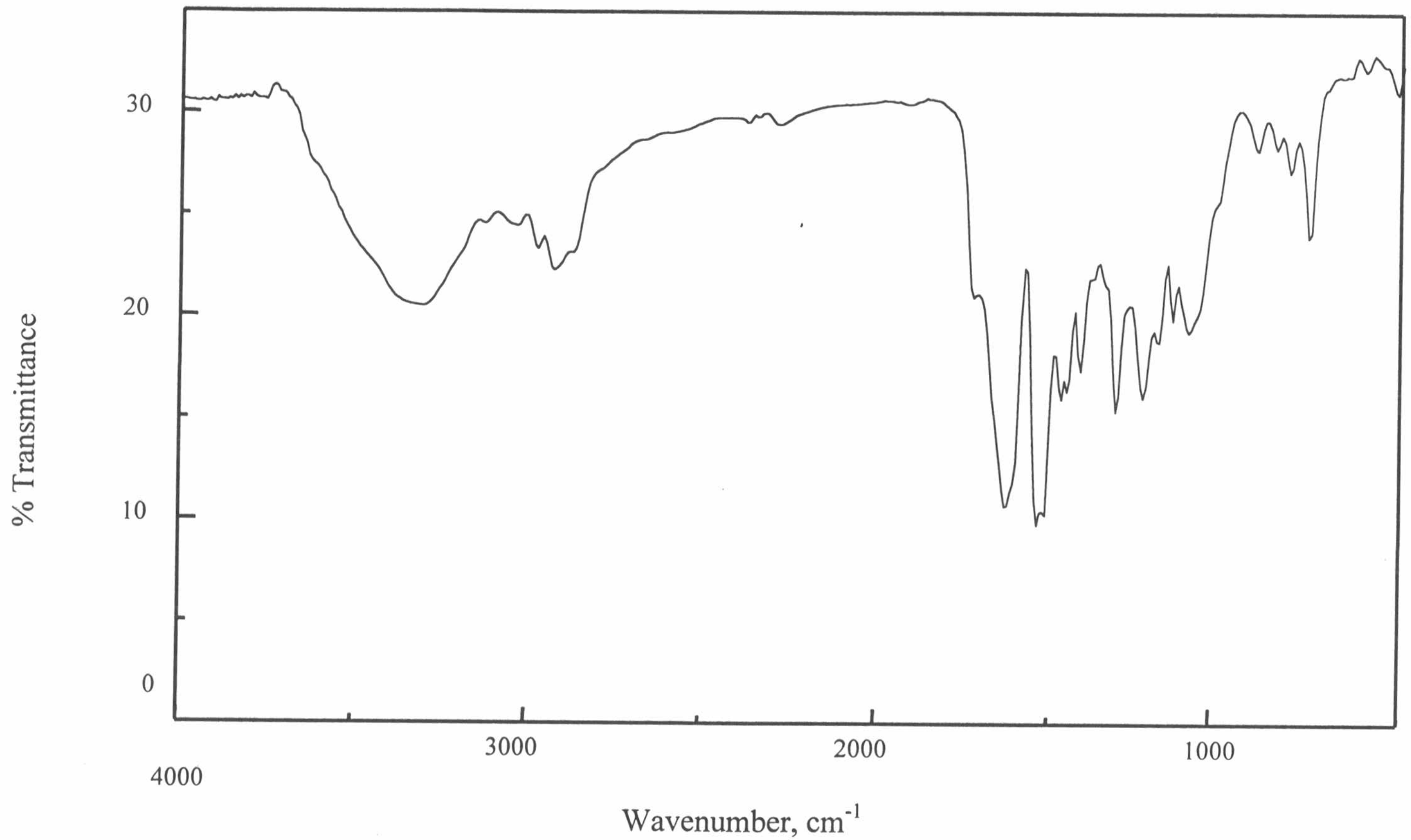

Figure A.2 IR spectrum of PP1000-Zn-MDI-50

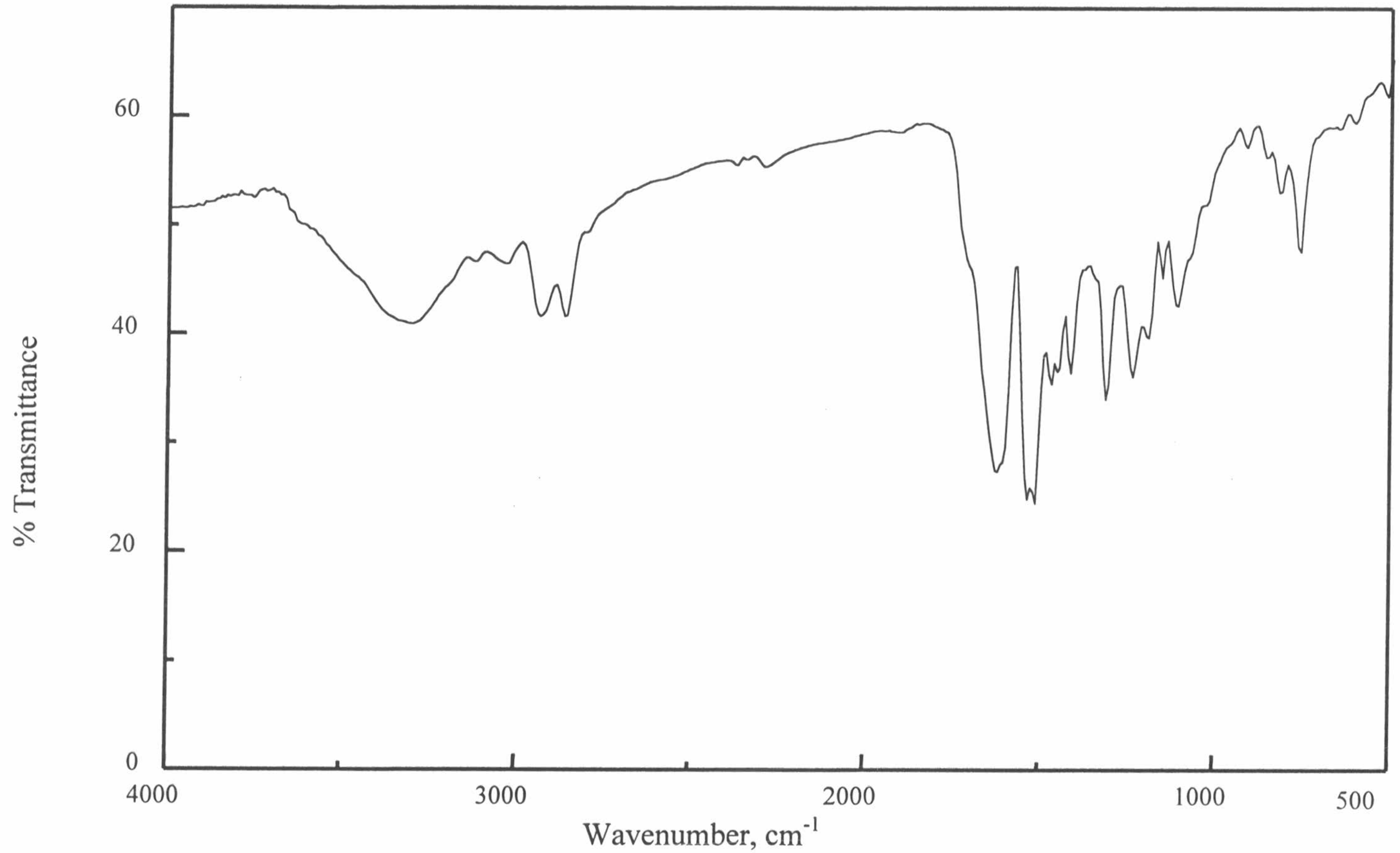

Figure A.3 IR spectrum of PB1600-Zn-MDI-50

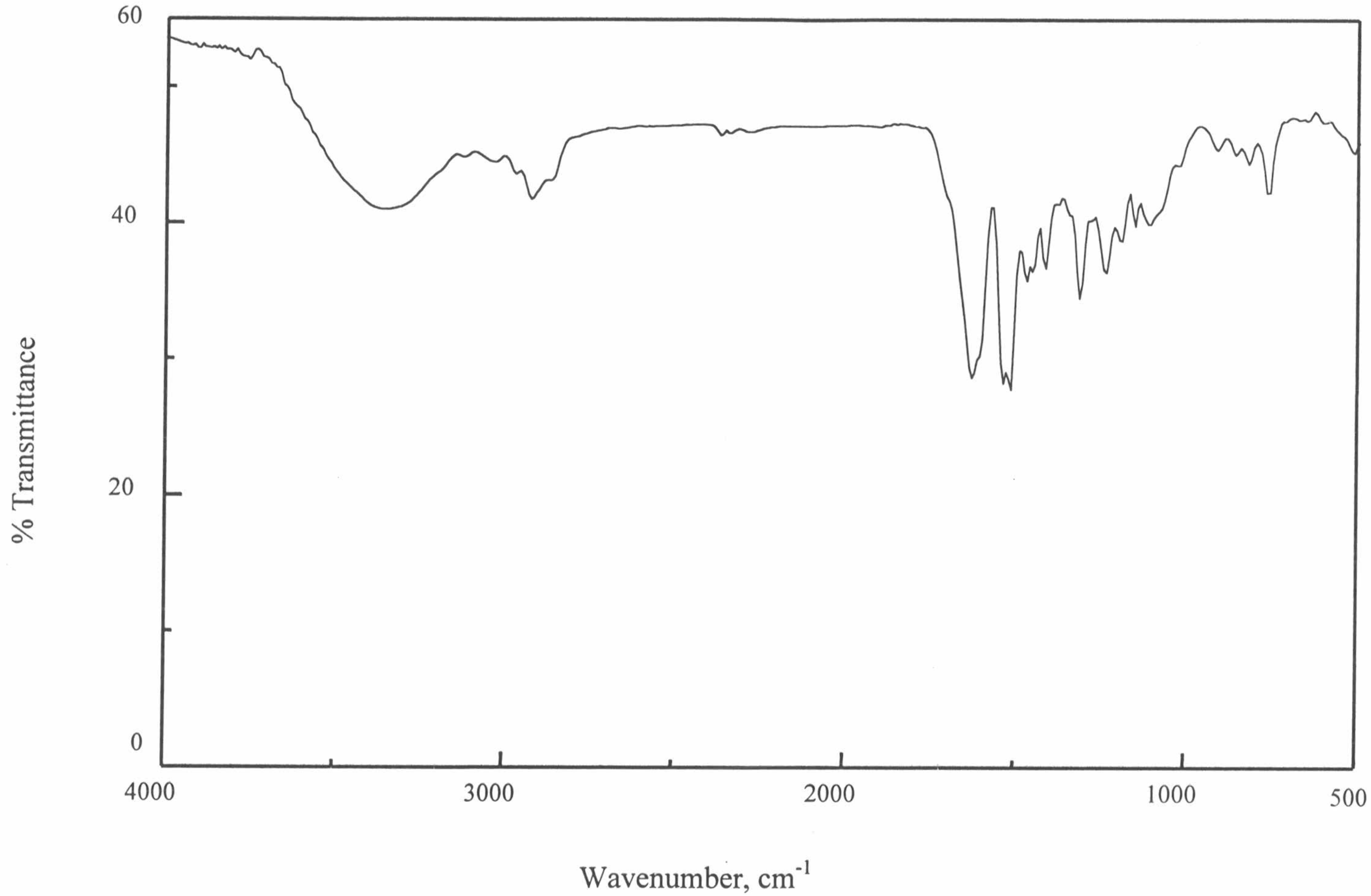

Figure A.4 IR spectrum of PP2300-Zn-MDI-50

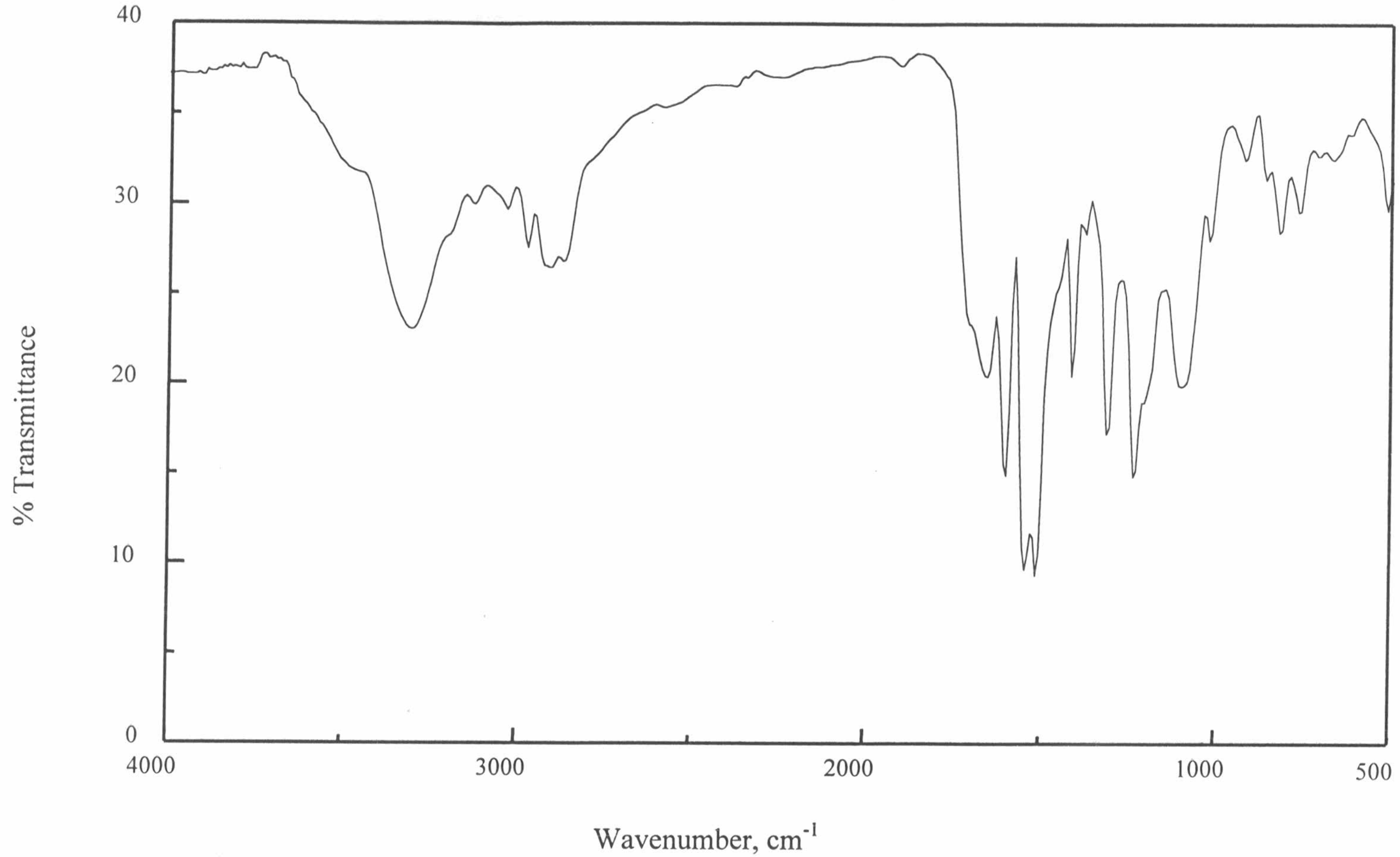

Figure A.5 IR spectrum of PP2300-Ni-MDI-50

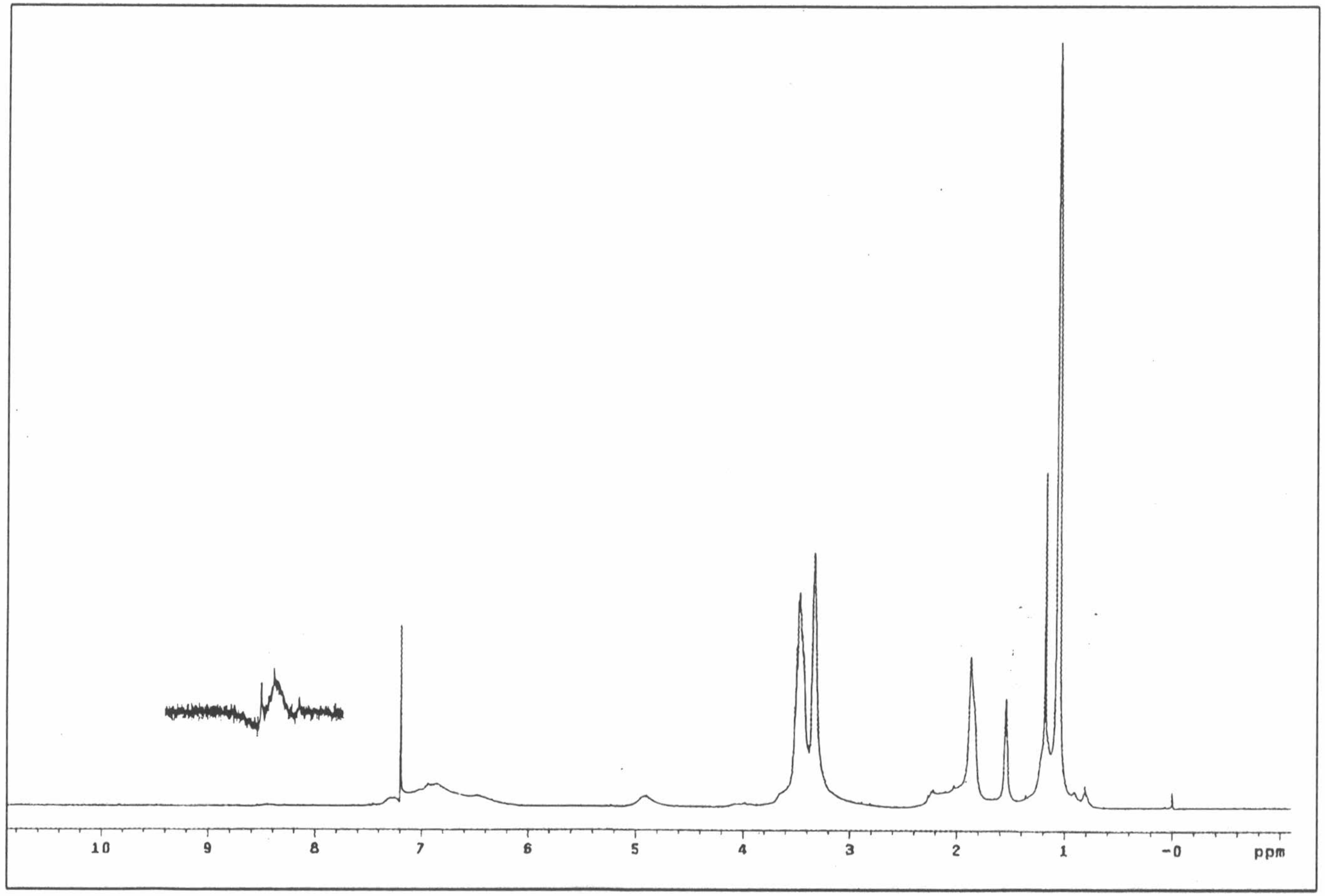

Figure A.6 ^{1}H NMR spectrum of PP1000-Zn-30

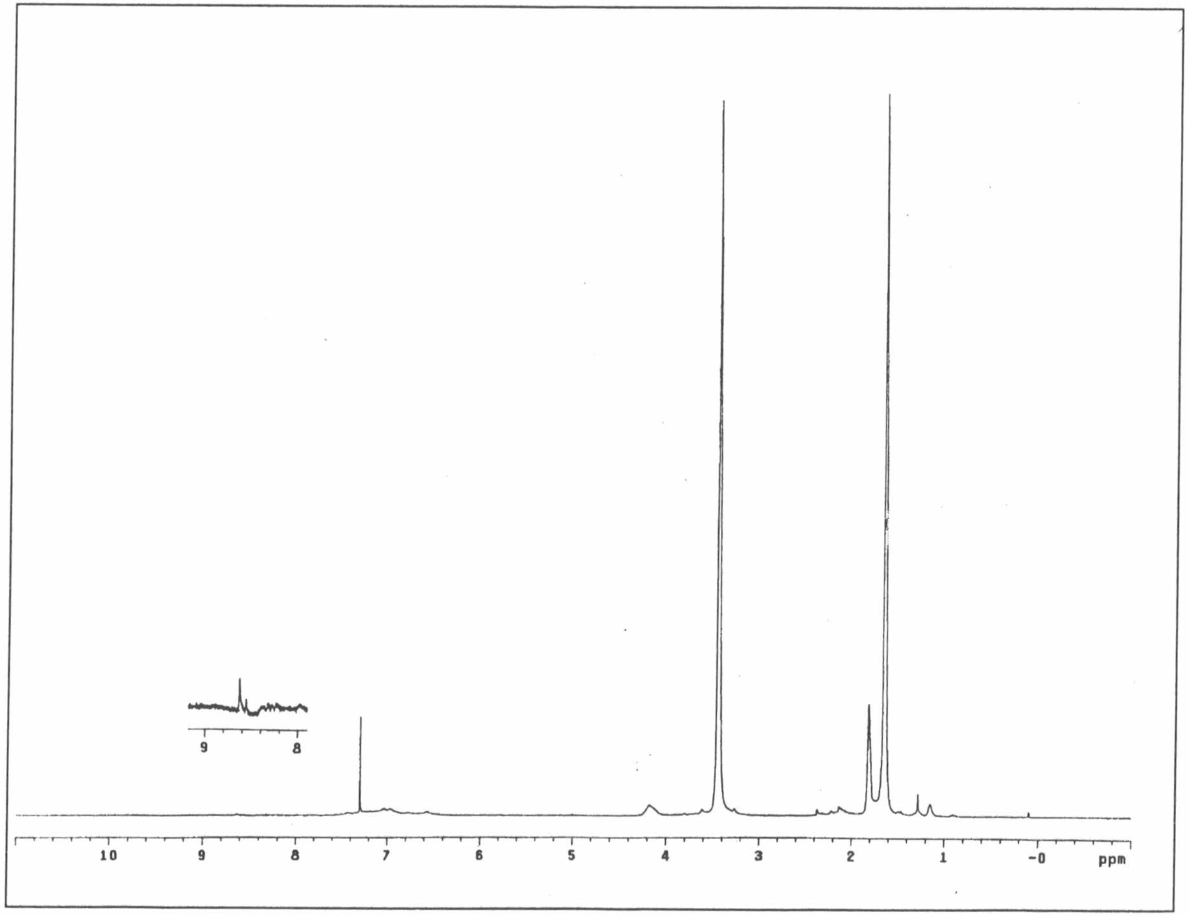

Figure A.7 ^{1}H NMR spectrum of PB1600-Zn-20

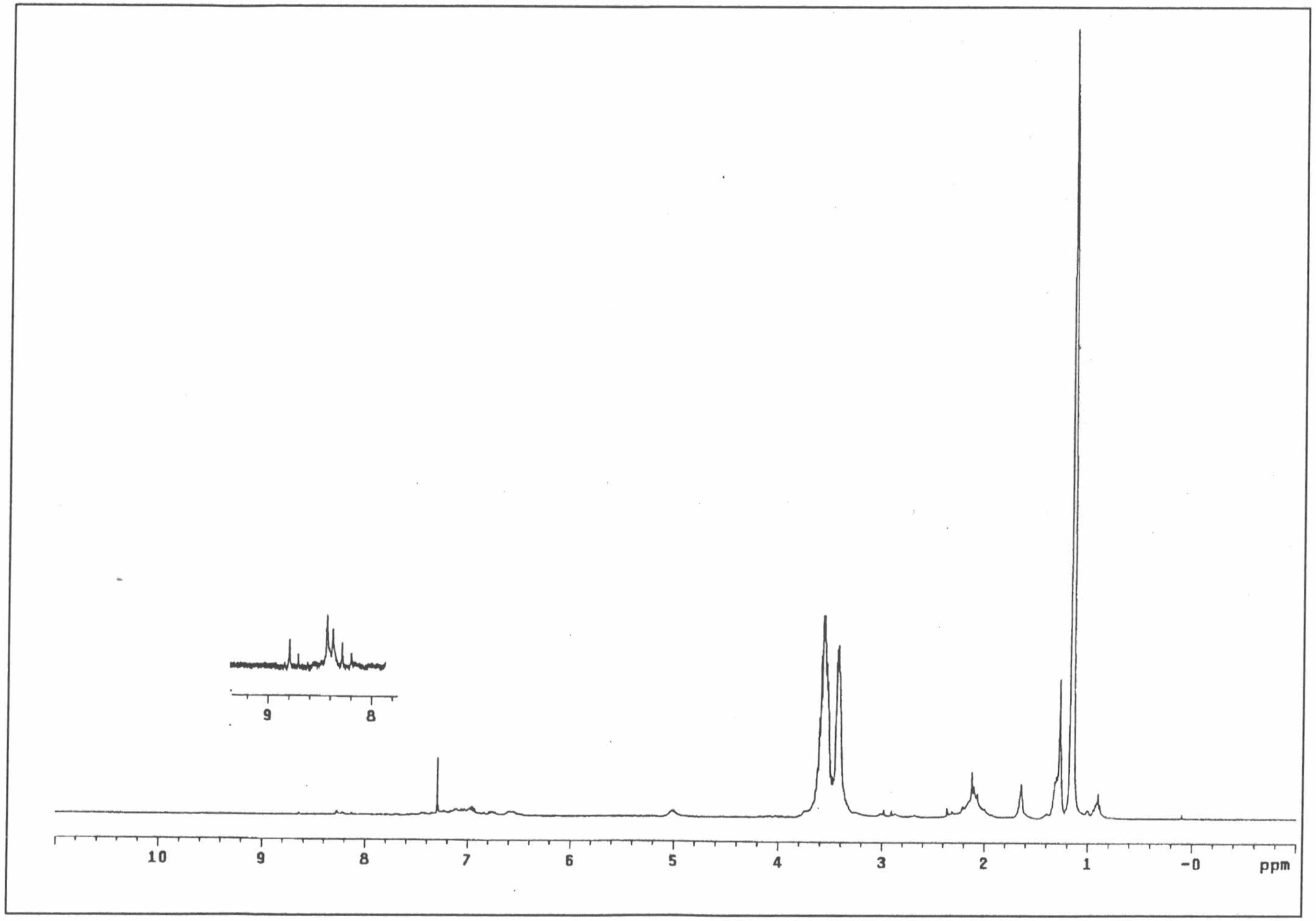

Figure A.8 ^{1}H NMR spectrum of PP2300-Zn-20

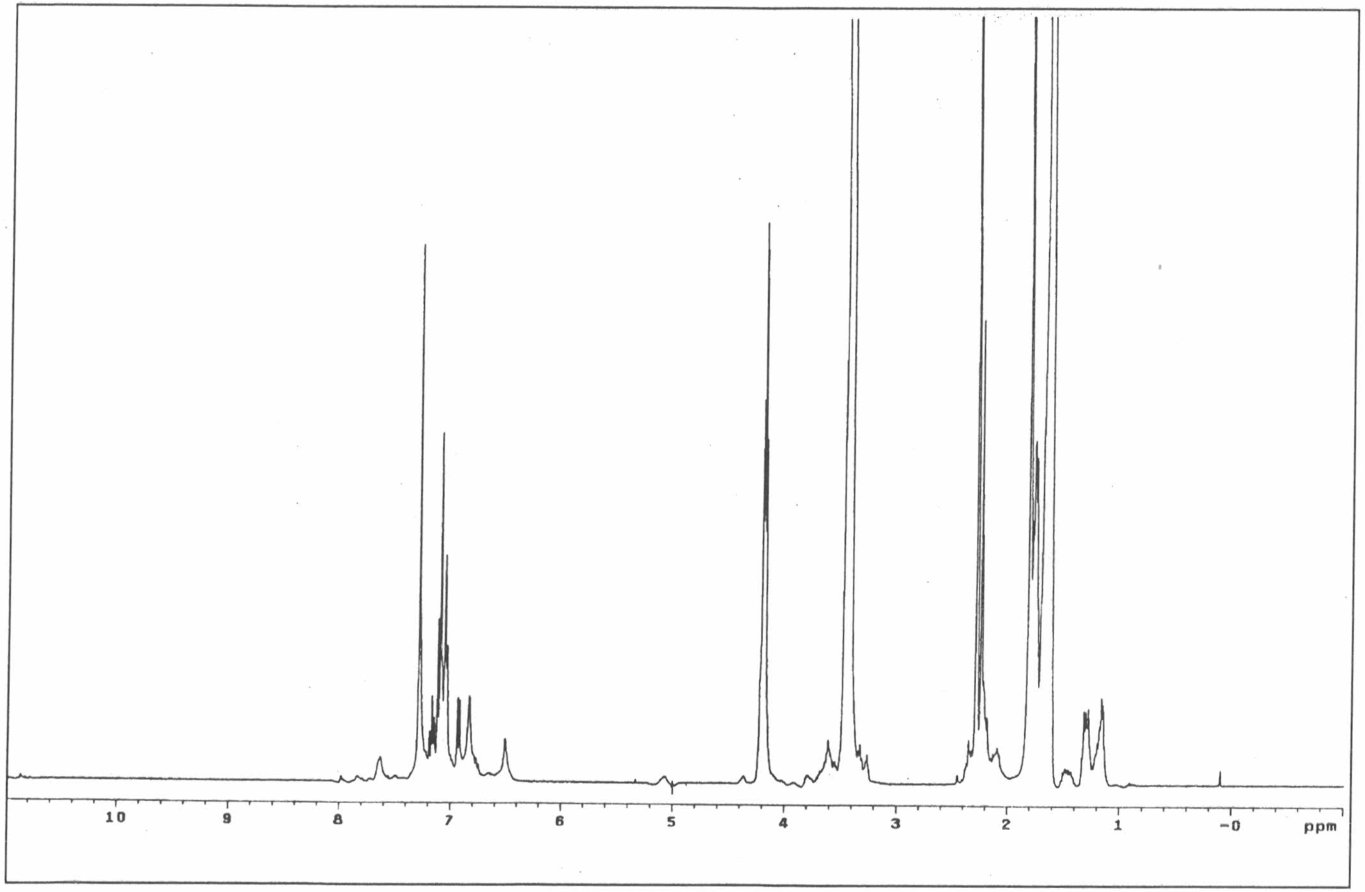

Figure A.9 ^{1}H NMR spectrum of PB900

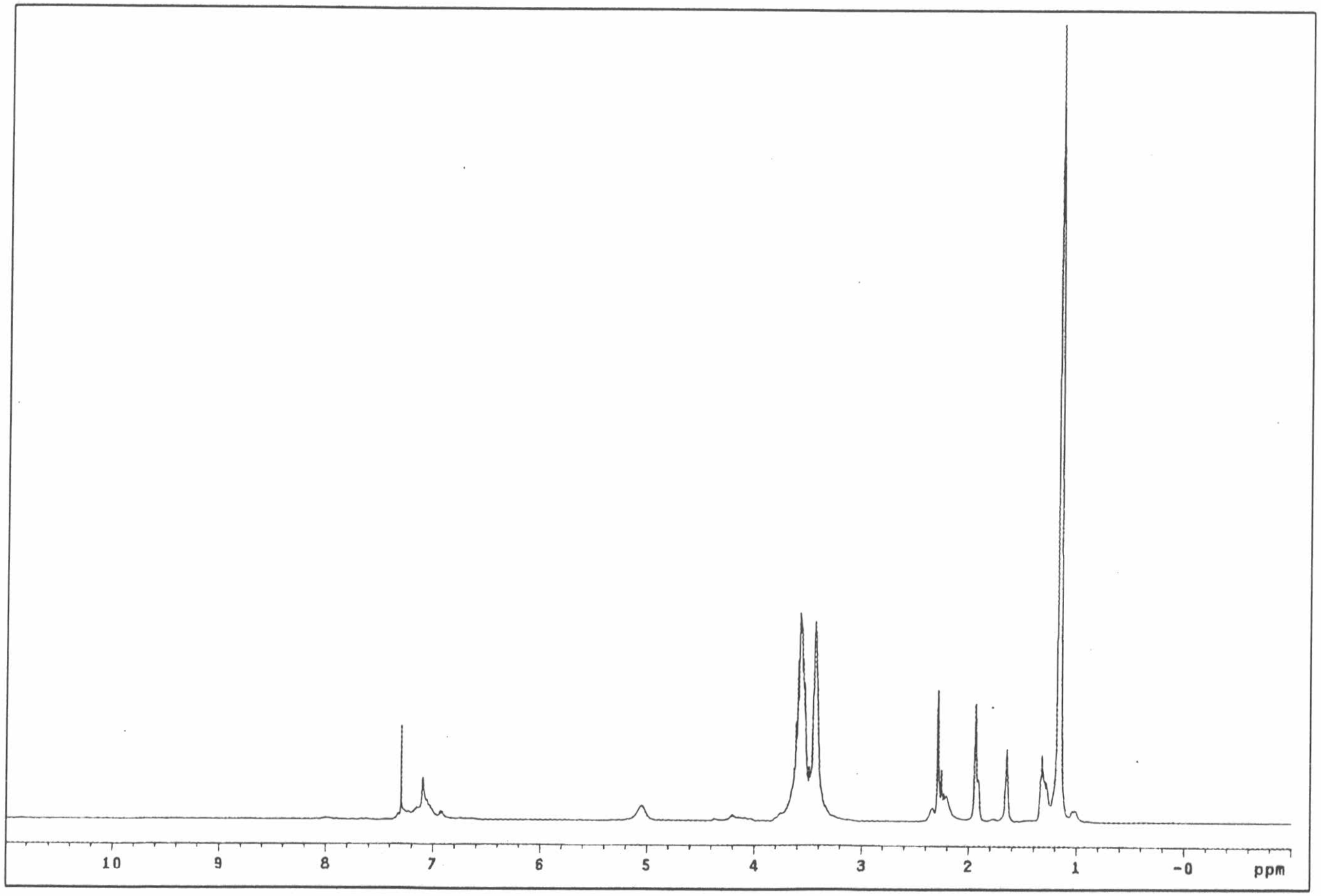

Figure A.10 ^{1}H NMR spectrum of PP1000

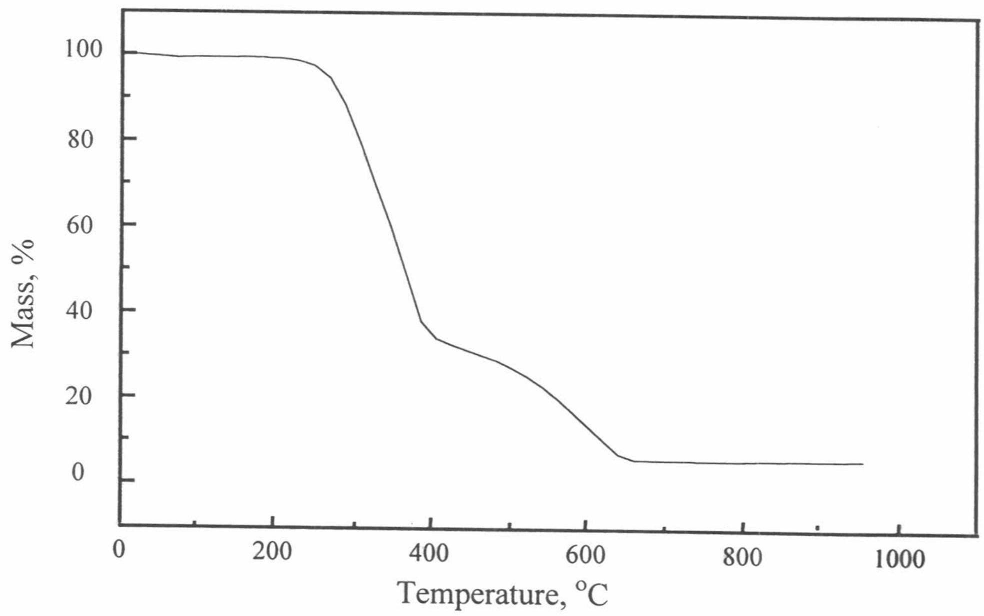

Figure A.11 TGA thermogram of PB900-Zn-30

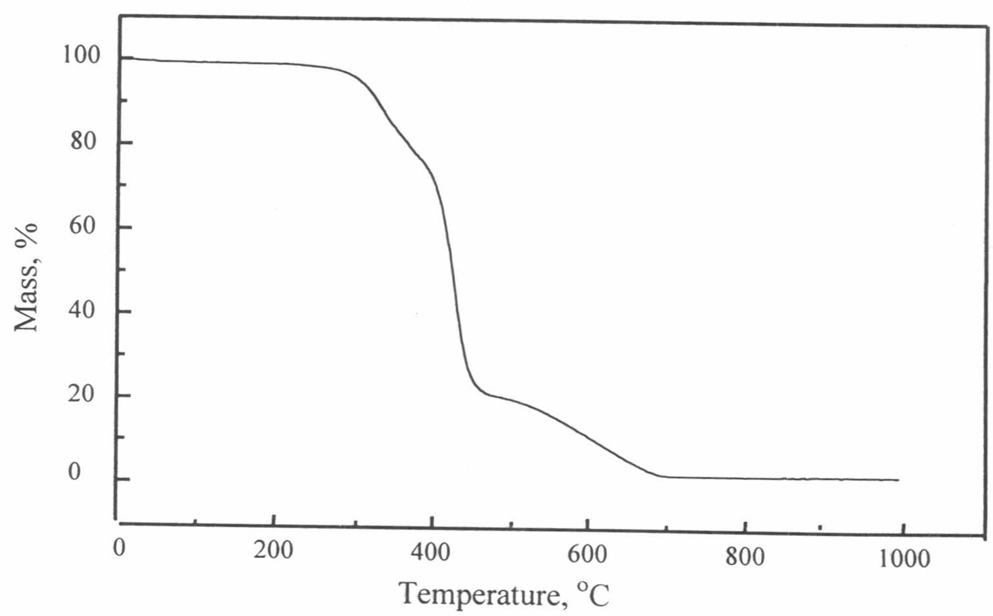

Figure A.12 TGA thermogram of PB1600-Zn-20

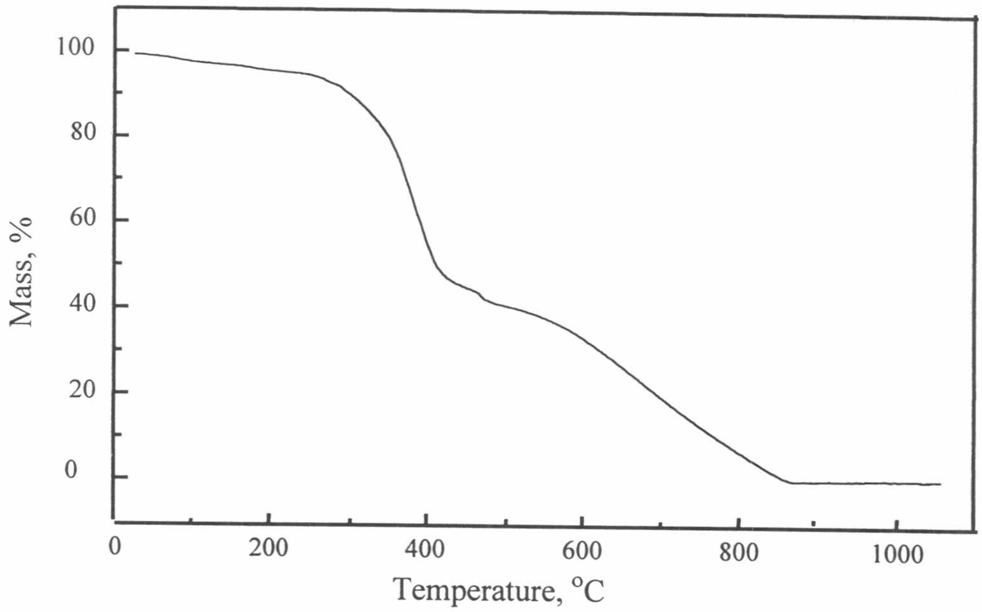

Figure A.13 TGA thermogram of PP1000-Zn-30

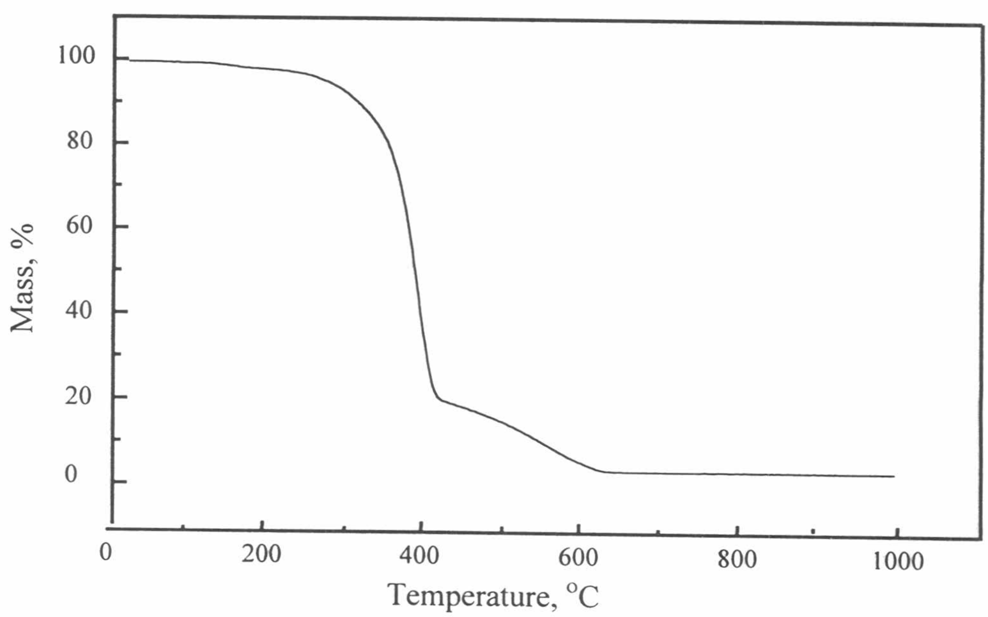

Figure A.14 TGA thermogram of PP2300-Zn-20

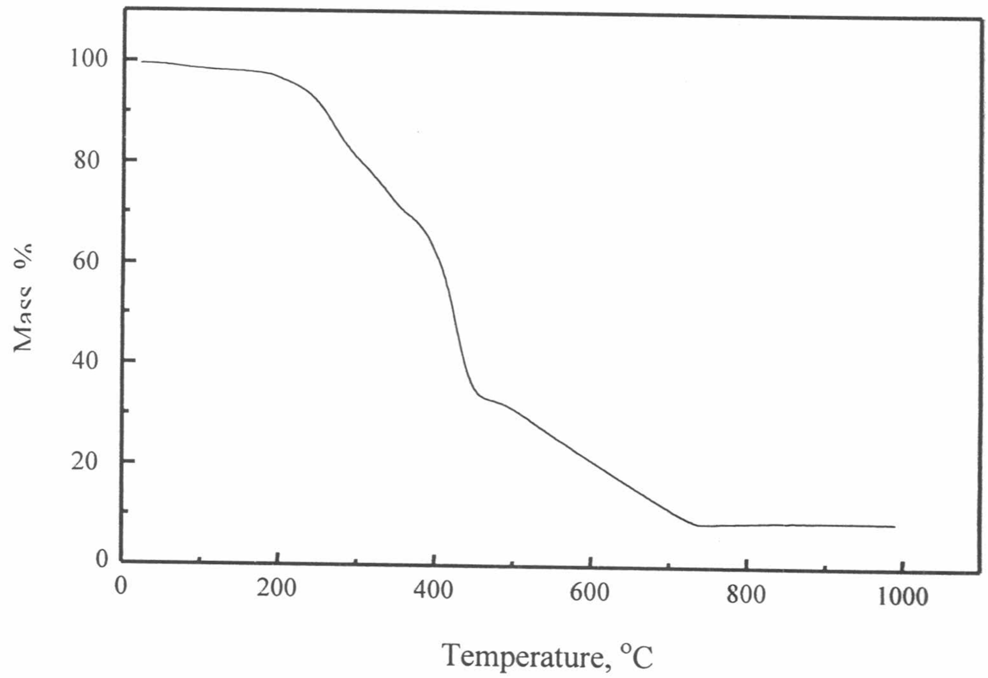

Figure A.15 TGA thermogram of PB900-Ni-30

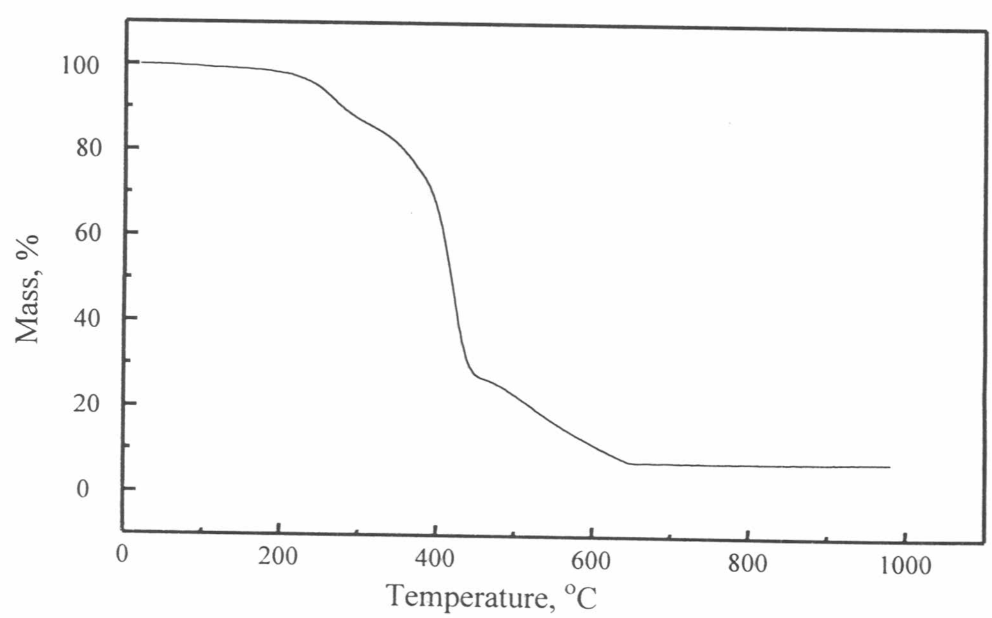

Figure A.16 TGA thermogram of PB1600-Ni-20

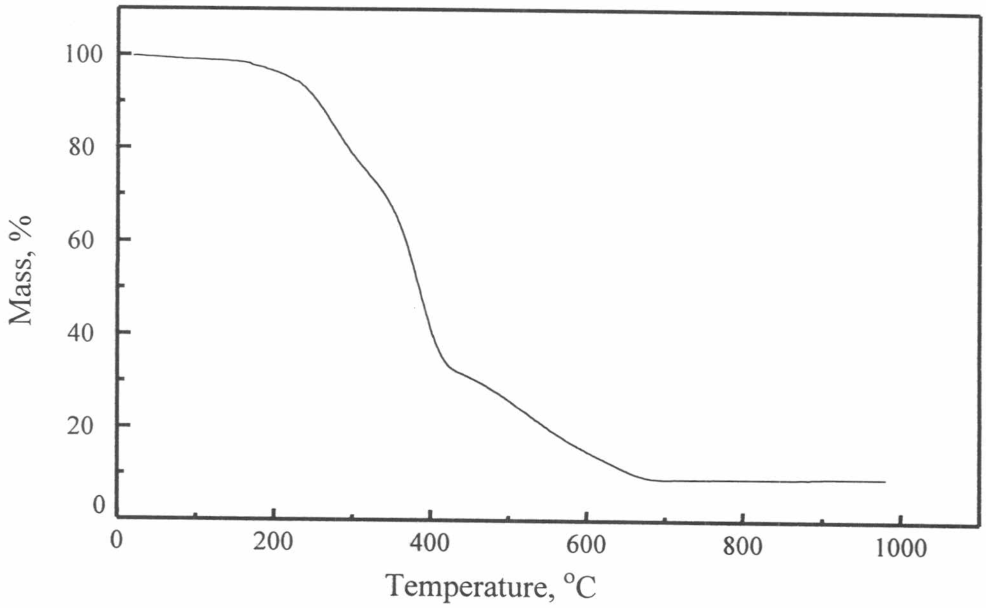

Figure A.17 TGA thermogram of PP1000-Ni-30

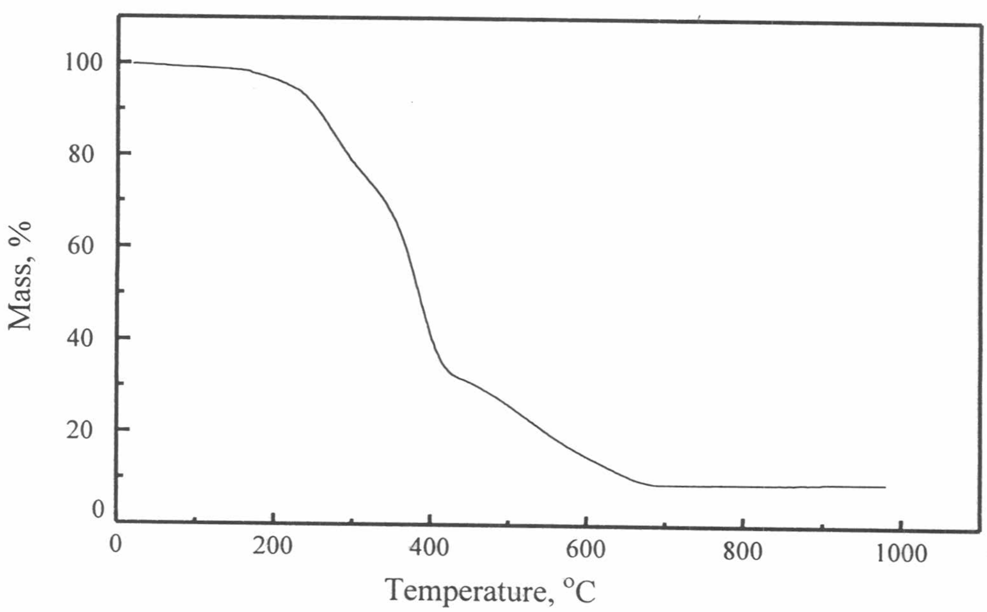

Figure A.18 TGA thermogram of PP2300-Ni-20

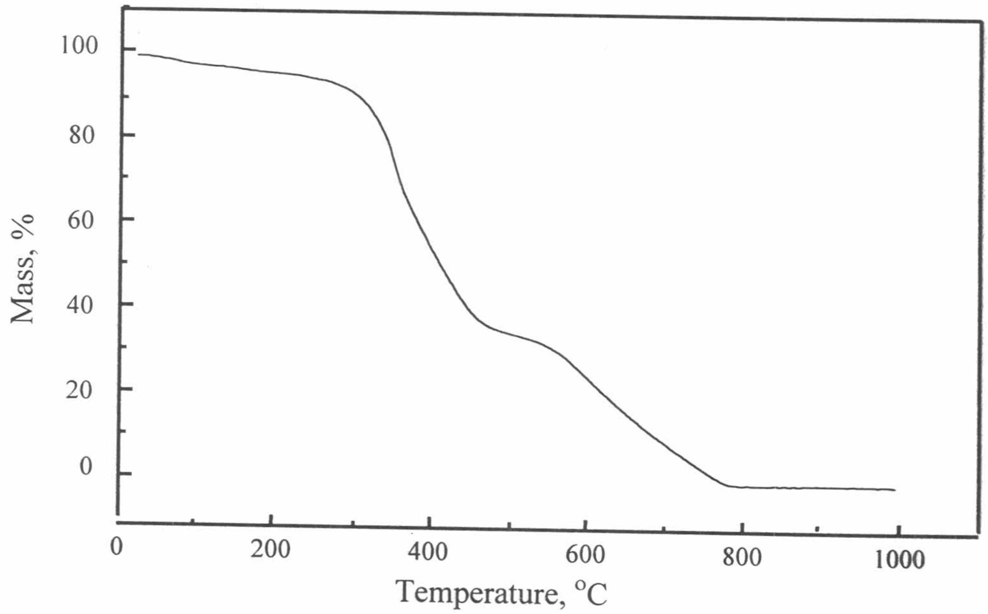

Figure A.19 TGA thermogram of PB900-Zn-MDI-50

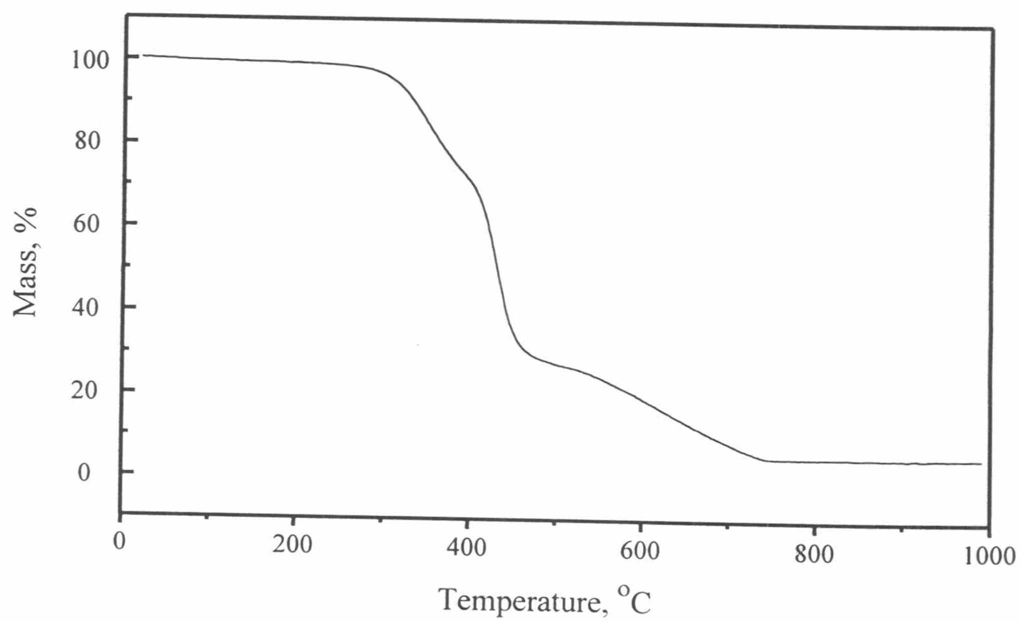

Figure A.20 TGA thermogram of PB1600-Zn-MDI-30

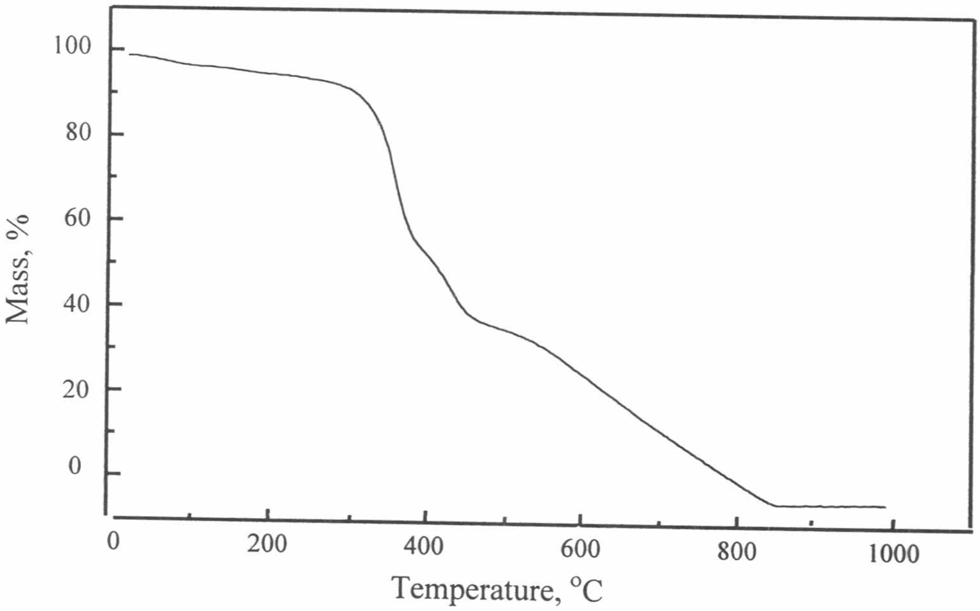

Figure A.21 TGA thermogram of PB1600-Zn-MDI-50

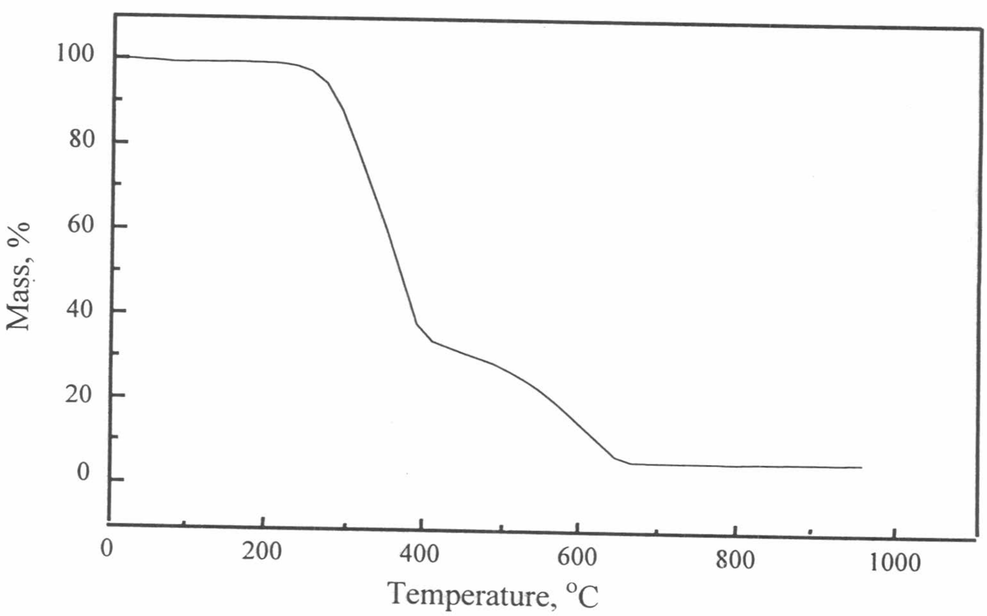

Figure A.22 TGA thermogram of PP1000-Zn-MDI-50

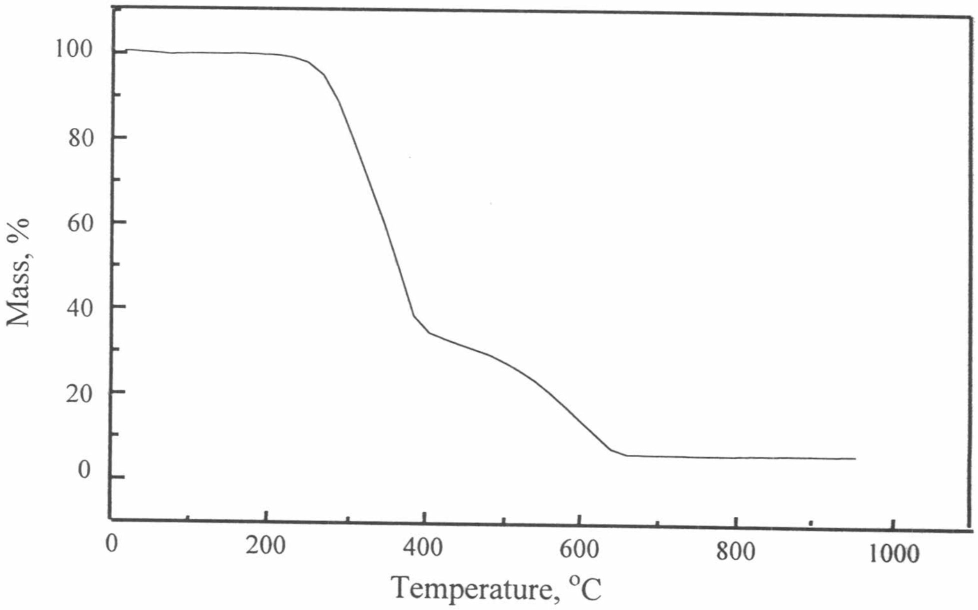

Figure A.23 TGA thermogram of PB2300-Zn-MDI-30

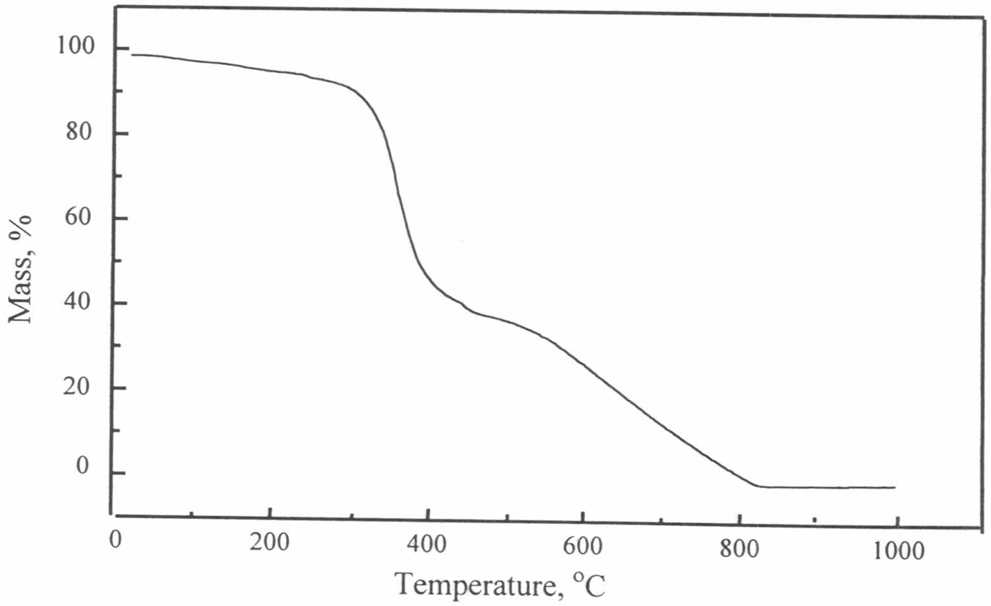

Figure A.24 TGA thermogram of PP2300-Zn-MDI-50

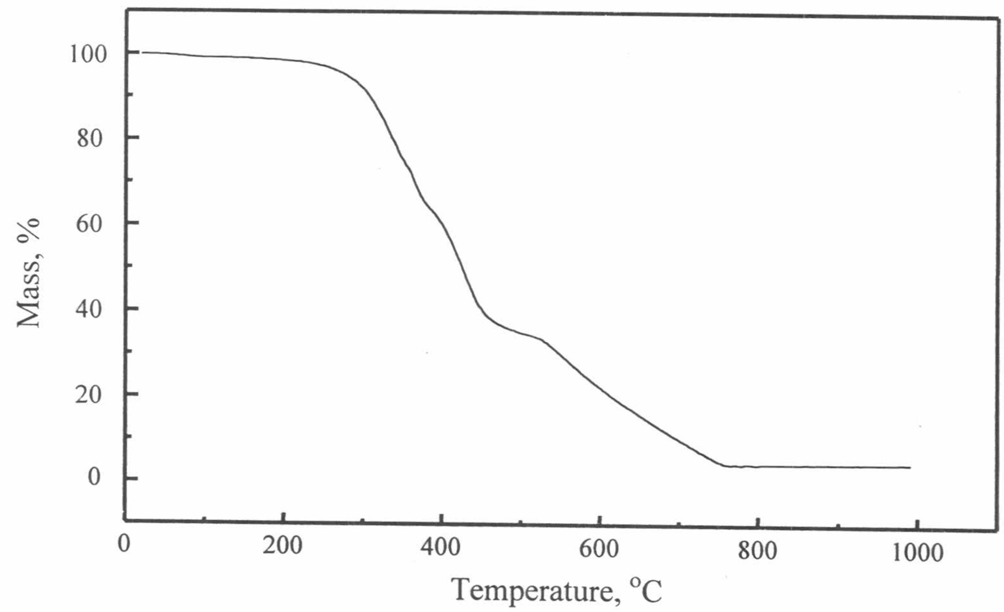

Figure A.25 TGA thermogram of PB900-Ni-MDI-50

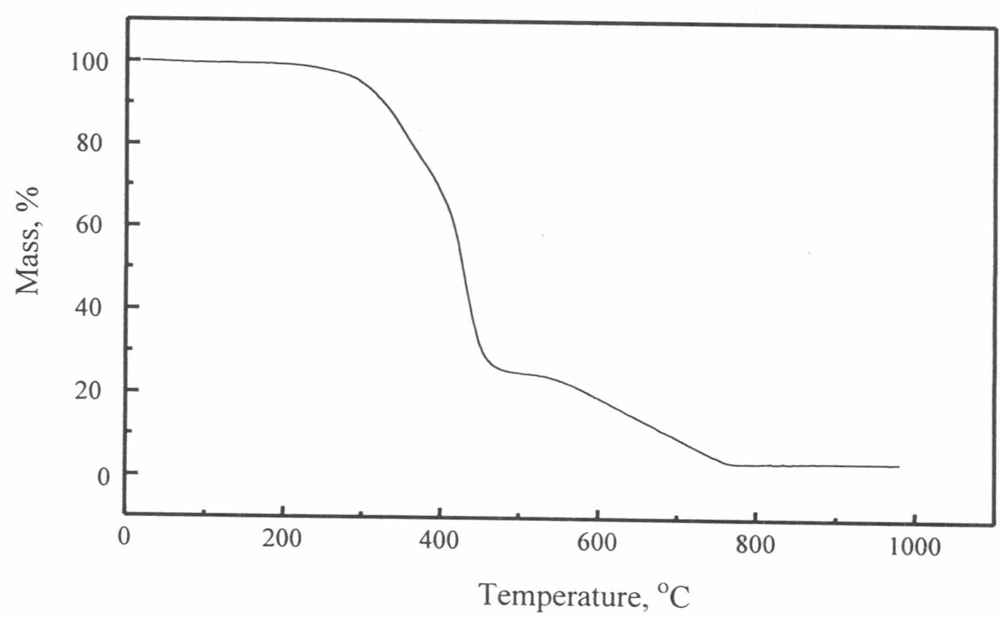

Figure A.26 TGA thermogram of PB1600-Ni-MDI-30

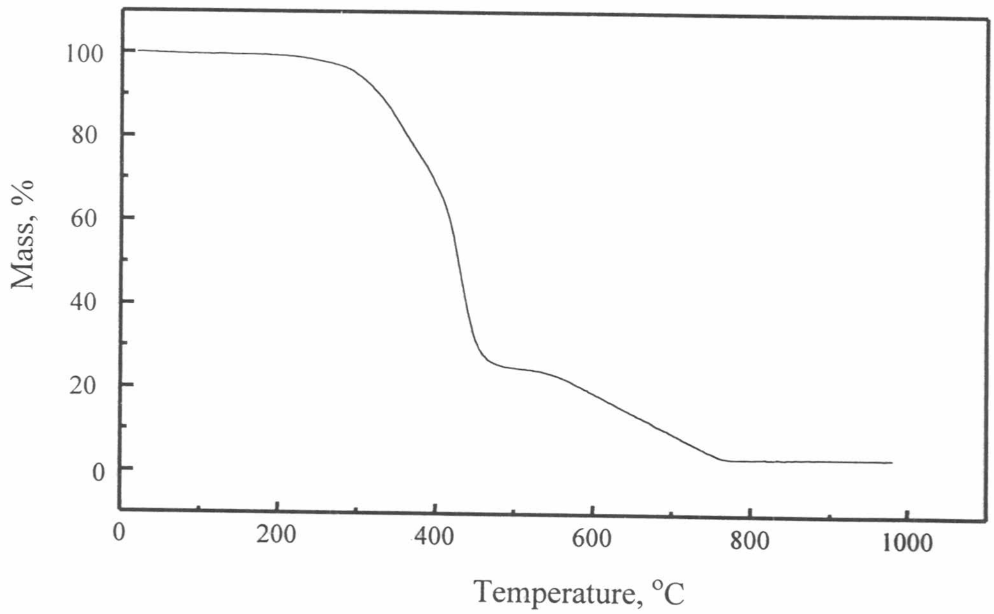

Figure A.27 TGA thermogram of PB1600-Ni-MDI-50

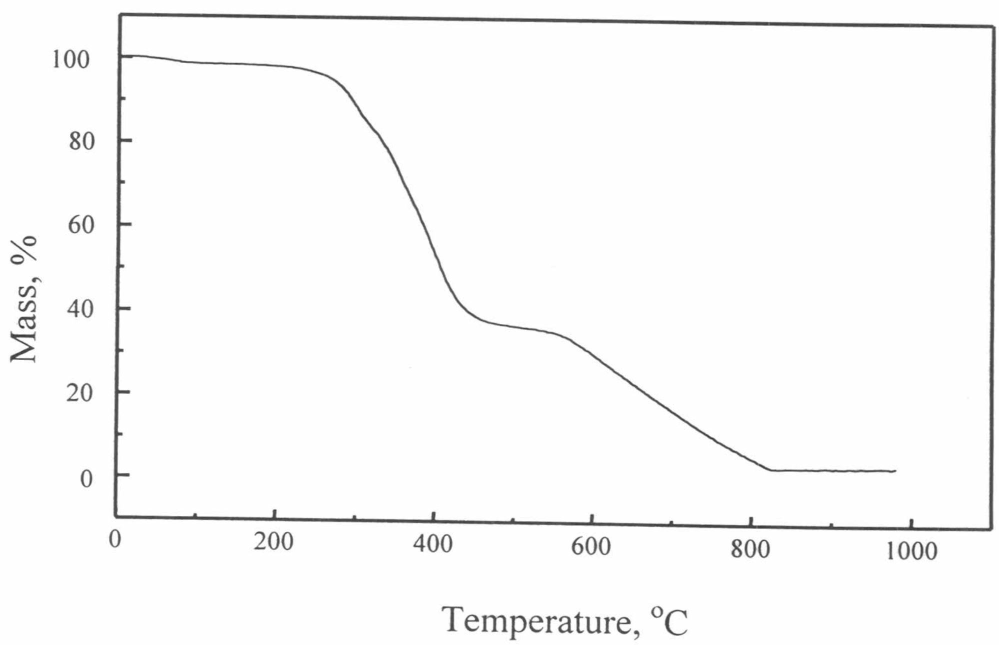

Figure A.28 TGA thermogram of PP1000-Ni-MDI-50

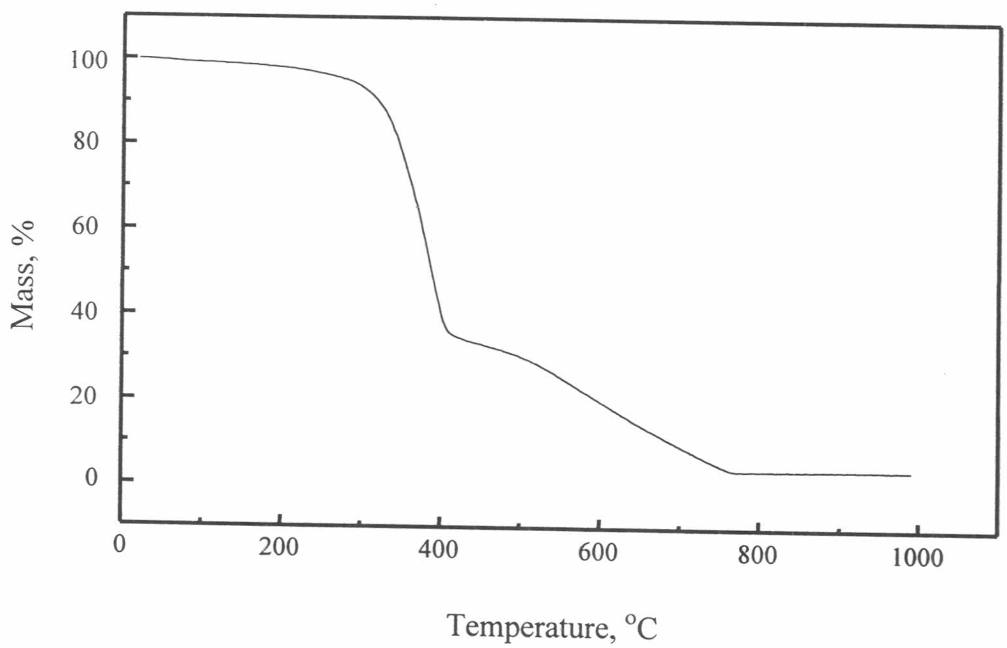

Figure A.29 TGA thermogram of PP2300-Ni-MDI-30

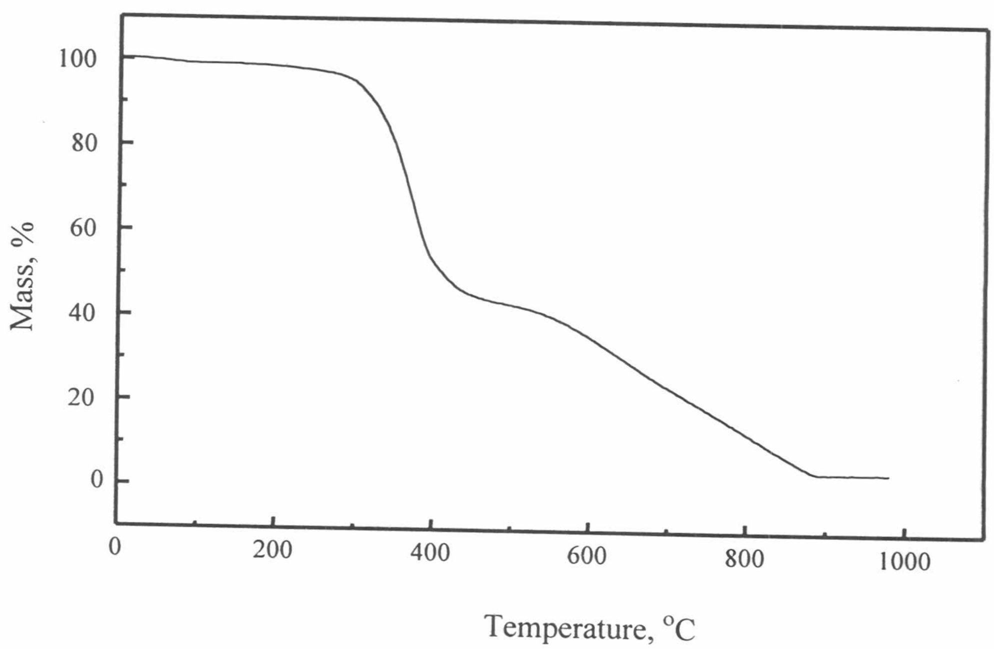

Figure A.30 TGA thermogram of PP2300-Ni-MDI-50

APPENDIX B

Limitting Oxygen Index (LOI) ASTM D2863-70: the minimum concentration of oxygen, expressed as volume percent, in a mixture of oxygen and nitrogen that will just support flaming combustion of a material initially at room temperature. The LOI method used for self-supporting samples has been modified as described below to accommodate the viscous of powdery samples. The measurement was carried out as follow. About 1 g of the polymer sample was placed in a glass cup (diameter 20 mm, height 10 mm) fitted to the specimen holder. An external flame of 20 mm length was maintained in contact, for 10 s, with the polymer. The LOI value was taken as the minimum percentages of oxygen required in a nitrogen-oxygen atmosphere, surrounding the sample, to maintain its combustion for at least 30 s after ignition. The LOI value was taken as the average of five experiments each.

Apparatus

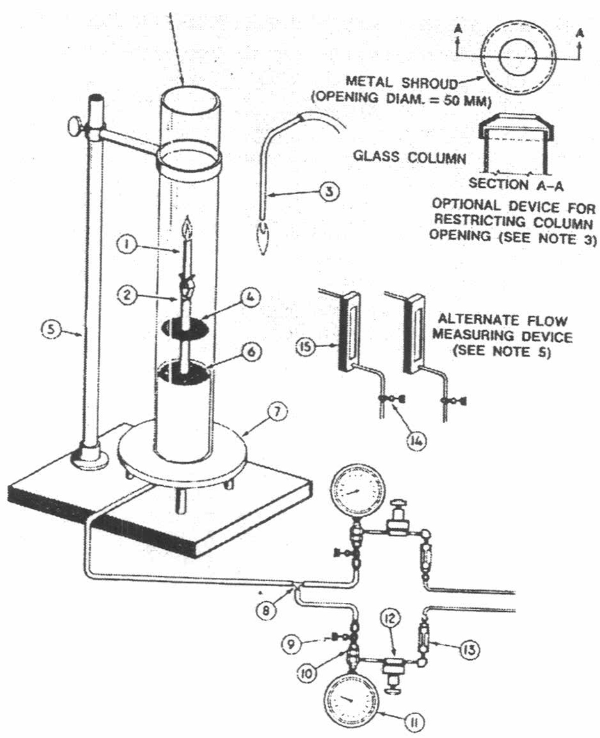

Figure B.1 LOI apparatus

Procedure

1. Calibrate the flow-measuring system using a water-sealed rotalin drummeter in accordance with Method D 1071

2. The test shall be conducted at room temperature conditions in accordance with Practice D 618
3. Clamp the specimen vertically in the approximate center of the column.
4. Select the desired initial concentration of oxygen. If the specimen burns rapidly, start at a concentration of about 18%.
5. Set the flow valves so that the desired initial concentration of oxygen in flowing through the column.
6. Allow the gas to flow for 30s to purge the system.
7. Ignite the entire top of the specimen with the ignition flame so that the specimen is well lighted. Remove the ignition flame and start the timer.
8. Do not adjust the oxygen concentration after igniting the specimen.
9. The concentration of oxygen must be raised if the flamimg of the specimen extinguishes before meeting.
10. Adjust the oxygen concentration, insert a new specimen.

DETERMINATION OF INHERENT VISCOSITY

The relative viscosity is given by:

$$\eta_{rel} = \frac{\text{solution flow time (t), sec}}{\text{solvent flow time } (t_o)\text{, sec}}$$

The inherent viscosity is calculated as:

$$\eta_{inh} = \frac{\eta_{rel}}{C}$$

Where

C = concentration of the polymer in grams per 100 ml of solvent; usually, C = 0.5 g/100 mL

$\ln\eta_{rel}$ = natural logarithm of the relative viscosity of the dilute polymer solution

$K = 0.01431$, $t_o = 98.97$ sec, $Kt_o = 1.4163$ sec

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