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APPENDIX

Table A-1 Sn Volatiliation Analysis by NAA

Sample : 5% ZHS + 10% DBDPO Polypropylene

: 5% ZS + 10% DBDPO Polypropylene

SAMPLE	wt. of sample (g)	% peak area	% Sn by NAA	% char yield	% Sn Volati- lization
standard Sn	0.02470	11761	9.42		
ZHS sample 1	0.05058	12405	6.44	4.13	
ZHS sample 2	0.04331	7939	6.81	4.13	
standard Sn	0.00500	2248	9.42		
ZHS sample 3	0.05340	12167	6.37	4.13	
ZHS sample 4	0.05280	9189	6.74	4.13	
average			6.59	4.13	86.92
standard Sn	0.00690	1139	9.42		
ZS sample 1	0.05490	3804	2.05	4.62	
ZS sample 2	0.05390	3018	2.31	4.62	
standard Sn	0.00530	9364	9.42		
ZS sample 3	0.05420	3013	2.46	4.62	
ZS sample 4	0.05530	2089	2.41	4.62	
average			2.31	4.62	95.70

Table A-2 Zn Volatilization Analysis by NAA

Sample : 5% ZHS + 10% DBDPO Polypropylene
 : 5% ZS + 10% DBDPO Polypropylene

SAMPLE	wt. of sample (g)	% peak area	% Zn by NAA	% char yield	% Zn Volatilization
standard ZnO ₂	0.011	17519	67.14		
ZHS sample 1	0.05498	13168	10.10%	4.13	
ZHS sample 2	0.06106	14966	10.33%	4.13	
ZHS sample 3	0.06705	16754	10.53%	4.13	
average			10.32%	4.13	62.63
ZS sample 1	0.05808	19006	13.80%	4.62	
ZS sample 2	0.06031	18289	12.78%	4.62	
average			13.29%	4.62	56.45

Table A-3 Br Volatilization Analysis by NAA

Sample : 5% ZHS + 10% DBDPO Polypropylene

: 5% ZS + 10% DBDPO Polypropylene

: 5% Sb₂O₃ + 10% DBDPO Polypropylene

SAMPLE	wt. of sample(g)	% peak area	% Br by NAA	% char yield	% Br Volatilization
standard NH ₄ Br	0.01095	10415	82.45		
ZHS sample 1	0.05470	19291	30.57	4.13	
ZHS sample 2	0.05200	20003	33.35	4.13	
standard NH ₄ Br	0.01162	14330	82.45		
ZHS sample 3	0.05220	21143	27.13	4.13	
ZHS sample 4	0.05210	23025	29.49	4.13	
average			30.14	4.13	85.00
standard NH ₄ Br	0.01175	12341	82.45		
ZS sample 1	0.05350	16167	23.72	4.62	
ZS sample 2	0.05680	18118	25.04	4.62	
standard NH ₄ Br	0.01138	17160	82.45		
ZS sample 3	0.05320	17718	18.21	4.62	
ZS sample 4	-			4.62	
average			22.32	4.62	87.59
standard NH ₄ Br	0.00878	8615	82.45		
Sb ₂ O ₃ sample 1	0.06180	2218	3.02	1.14	
Sb ₂ O ₃ sample 2	0.06710	2363	2.96	1.14	
standard NH ₄ Br	0.01210	11949	82.45		
Sb ₂ O ₃ sample 3	0.06410	2319	3.02	1.14	
Sb ₂ O ₃ sample 4	0.06370	2536	3.32	1.14	
average			3.08		99.58

Table A-4 Sb Volatilization Analysis by NAASample : 5% Sb₂O₃ + 10% DBDPO Polypropylene

SAMPLE	wt. of sample (g)	% peak area	% Sb by NAA	% char yield	% Sb Volatilization
standard Sb ₂ O ₃	0.00630	42069			
Sb ₂ O ₃ sample 1	0.05760	112122	30.20	1.14	
Sb ₂ O ₃ sample 2	0.06180	112047	28.63	1.14	
average			29.42	1.14	93.29

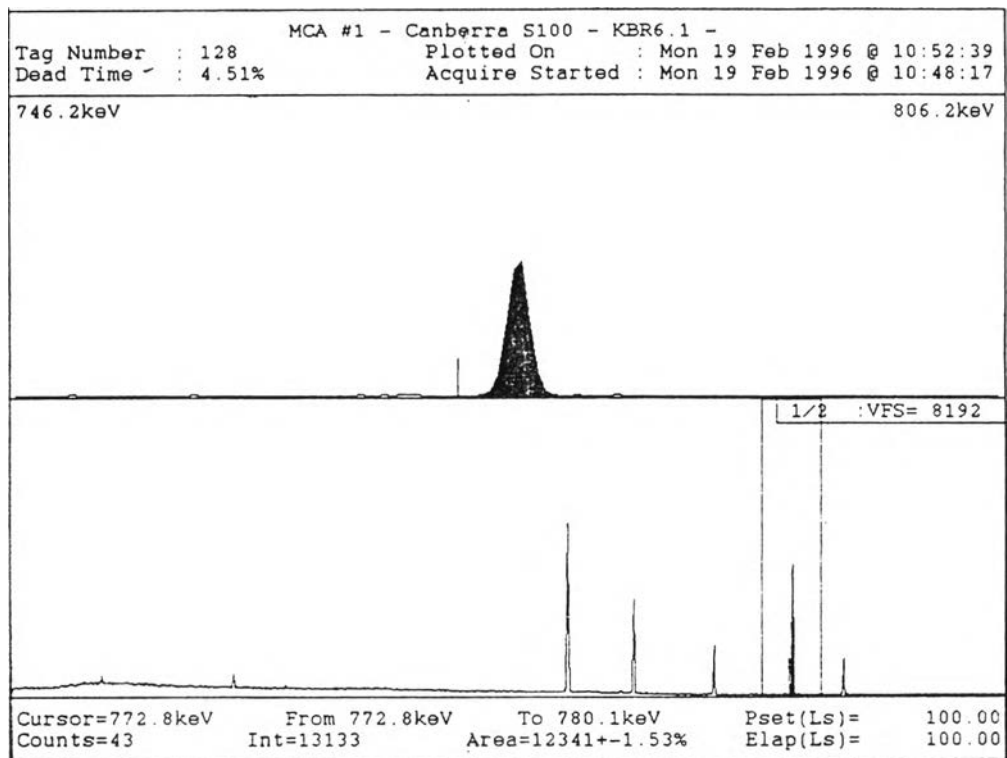


Figure A-1 Gamma ray spectrum of bromine in standard ammonium bromide.

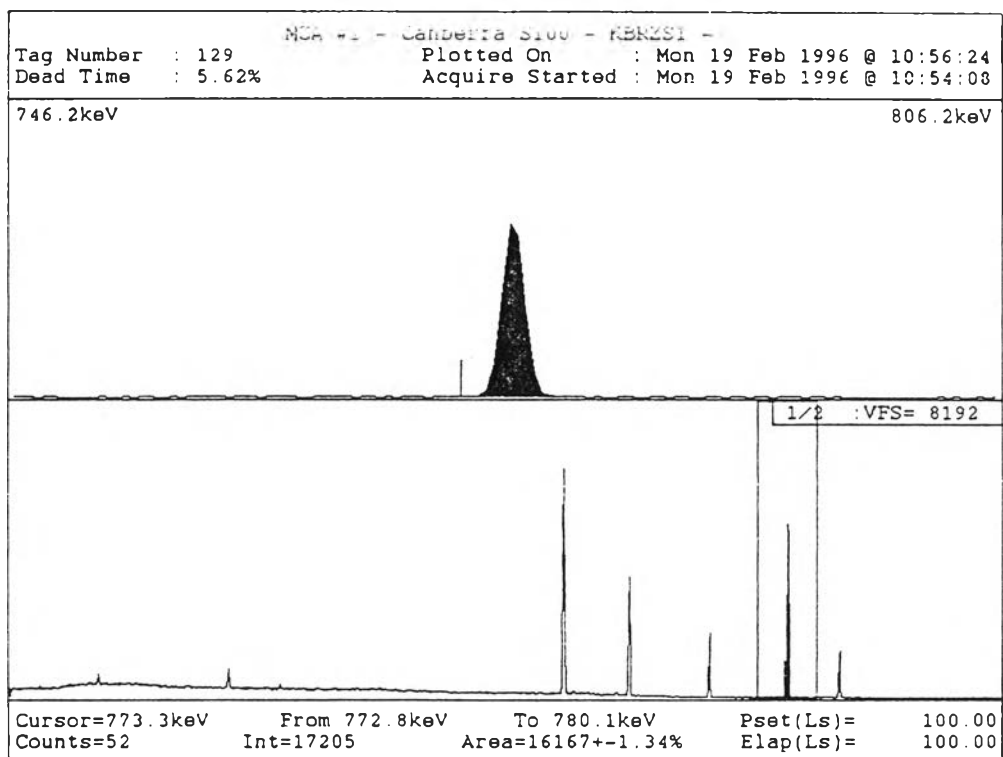


Figure A-3 Gamma ray spectrum of bromine in the char residue from flame retarding polypropylene containing 5% ZS and 10% DBDPO.

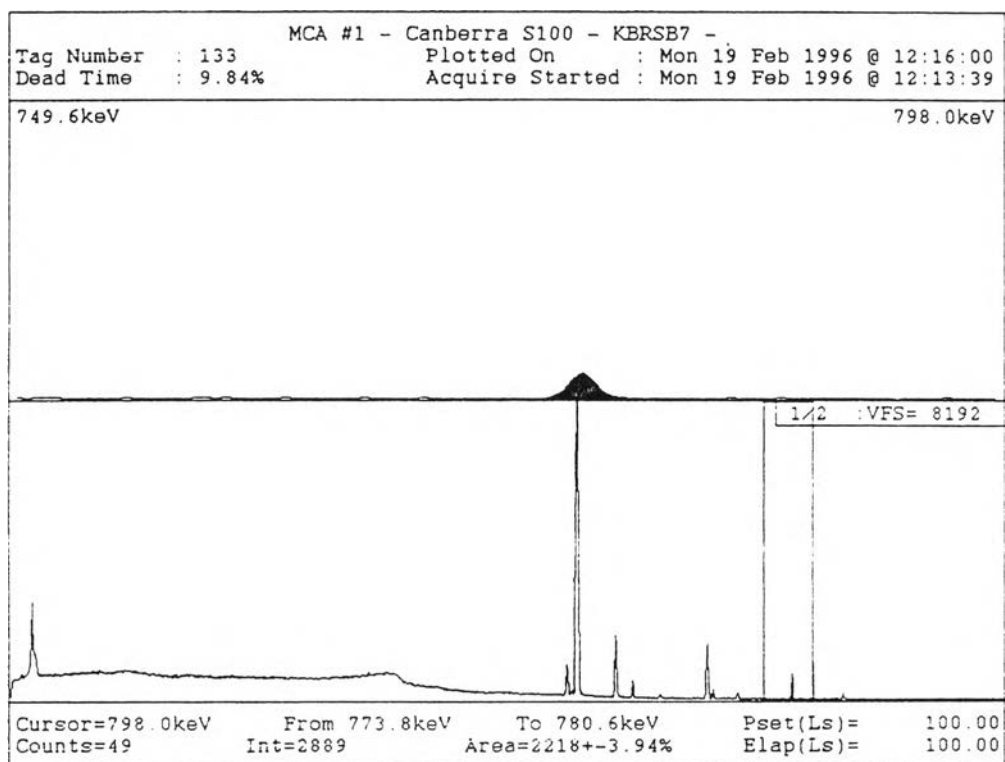


Figure A-4 Gamma ray spectrum of bromine in the char residue from flame retarding polypropylene containing 5% Sb_2O_3 and 10% DBDPO.

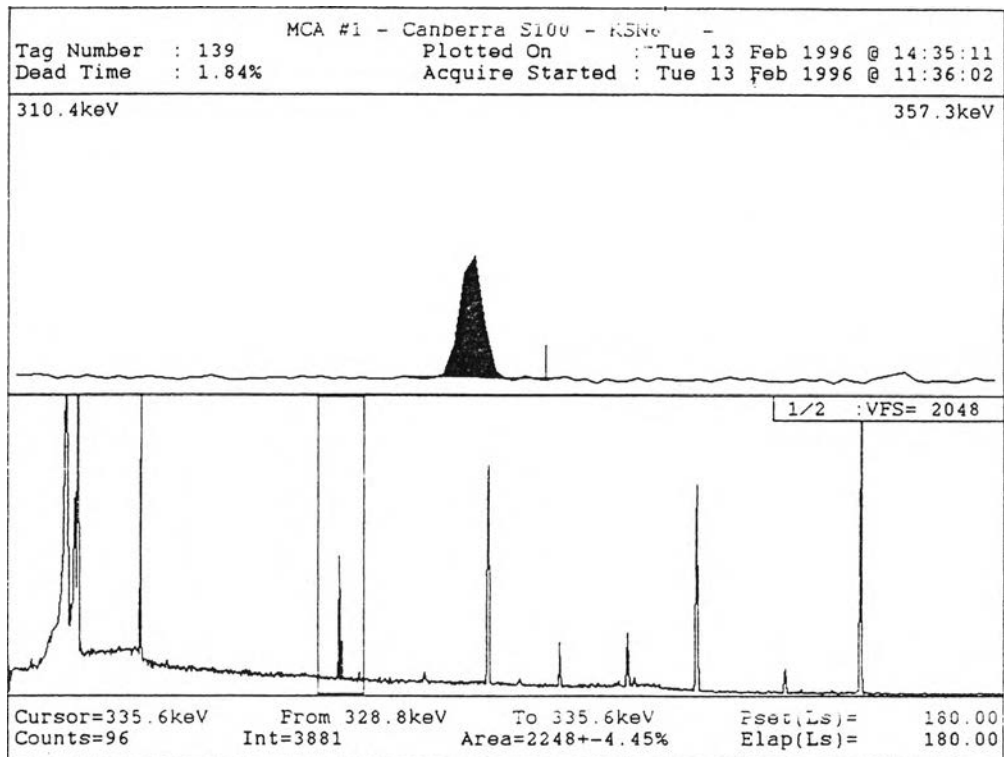


Figure A-5 Gamma ray spectrum of tin standard.

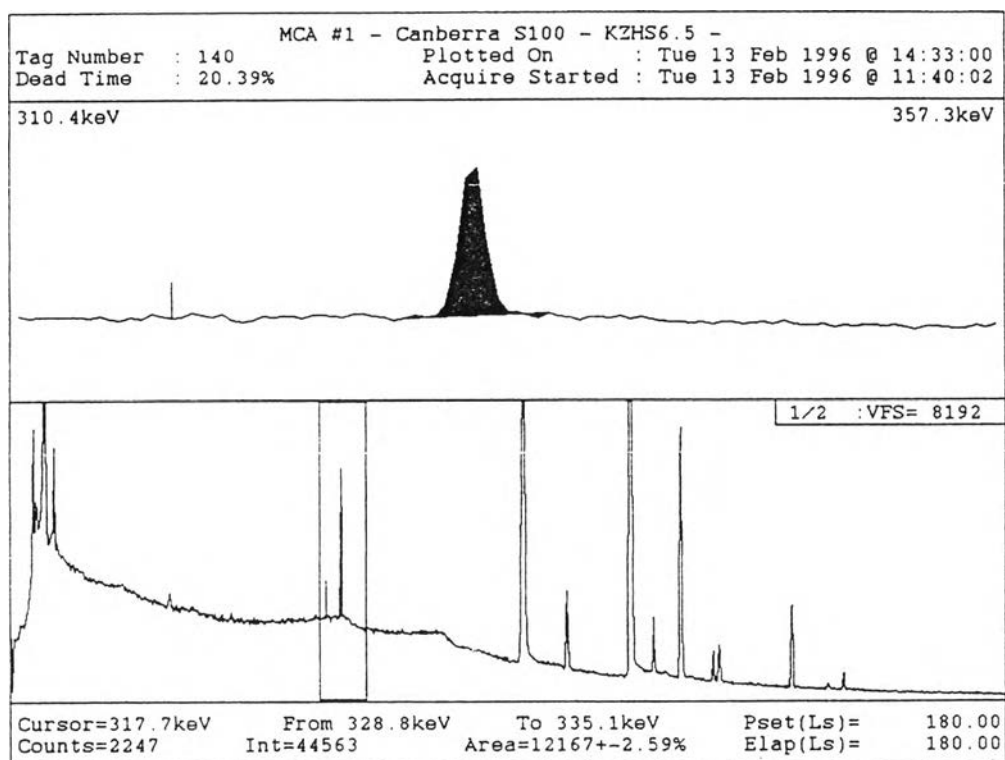


Figure A-6 Gamma ray spectrum of tin in the char residue from flame retarding polypropylene containing 5% ZHS and 10% DBDPO.

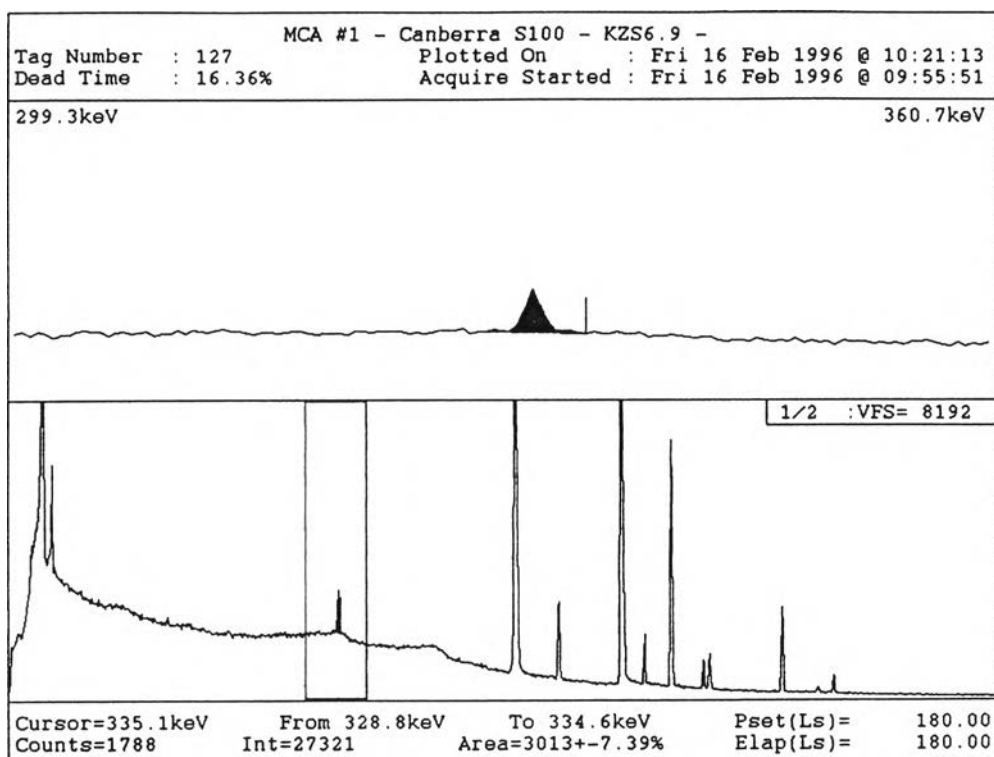


Figure A-7 Gamma ray spectrum of tin in the char residue from flame retarding polypropylene containing 5% ZS and 10% DBDPO.

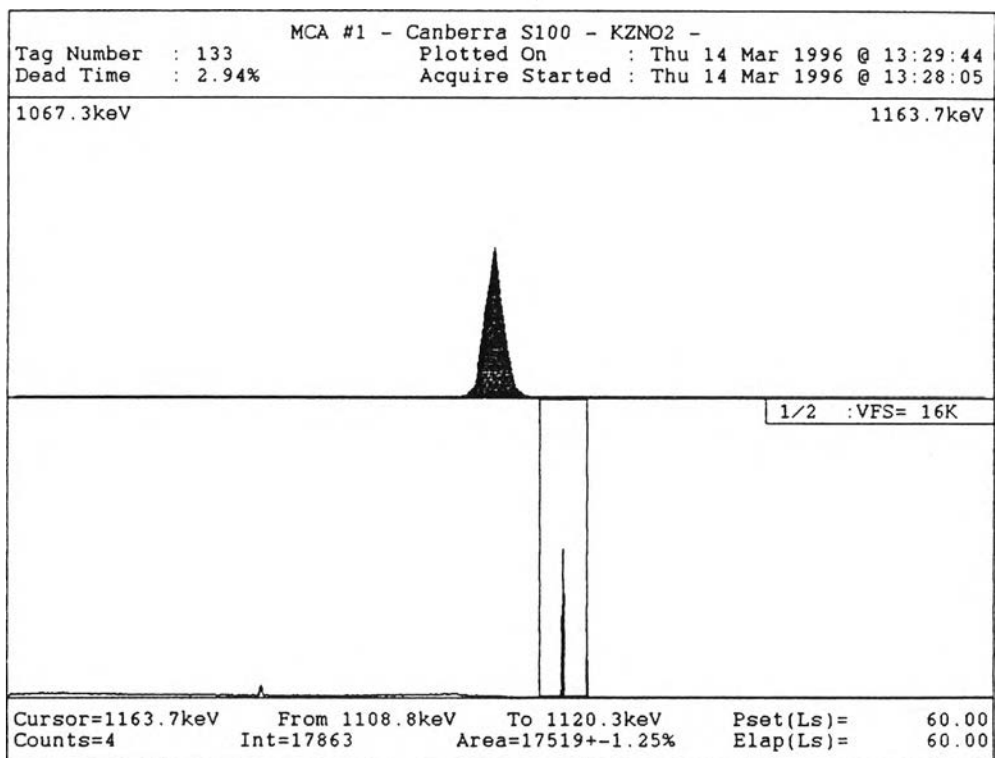


Figure A-8 Gamma ray spectrum of zinc in standard zinc oxide.

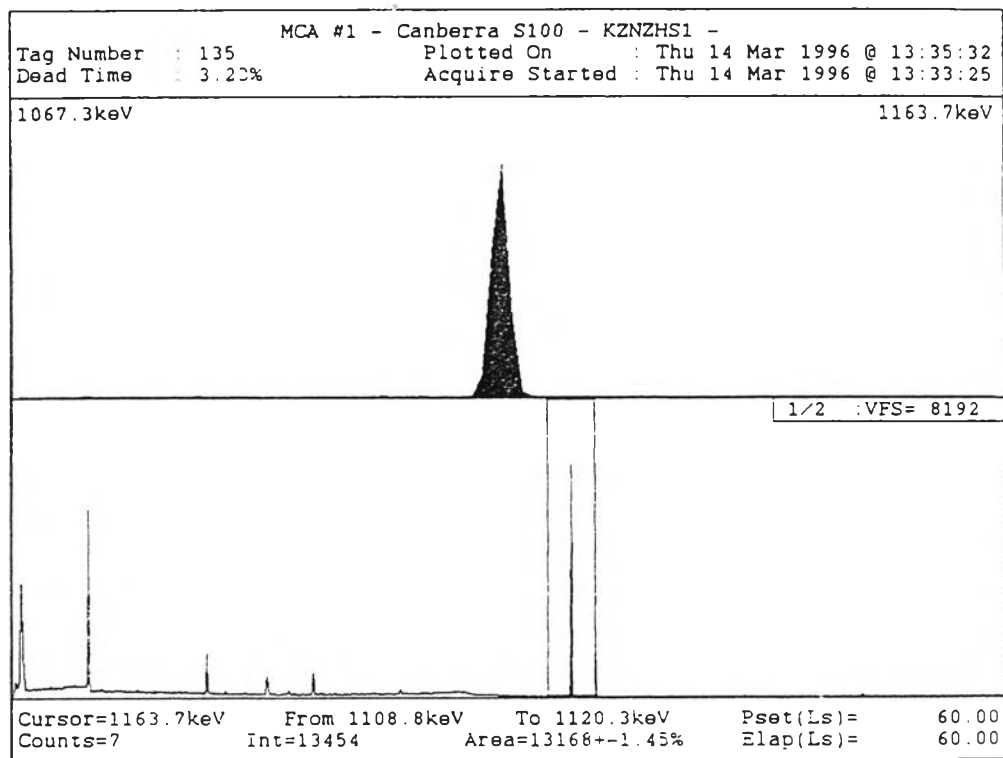


Figure A-9 Gamma ray spectrum of zinc in the char residue from flame retarding polypropylene containing 5% ZHS and 10% DBDPO.

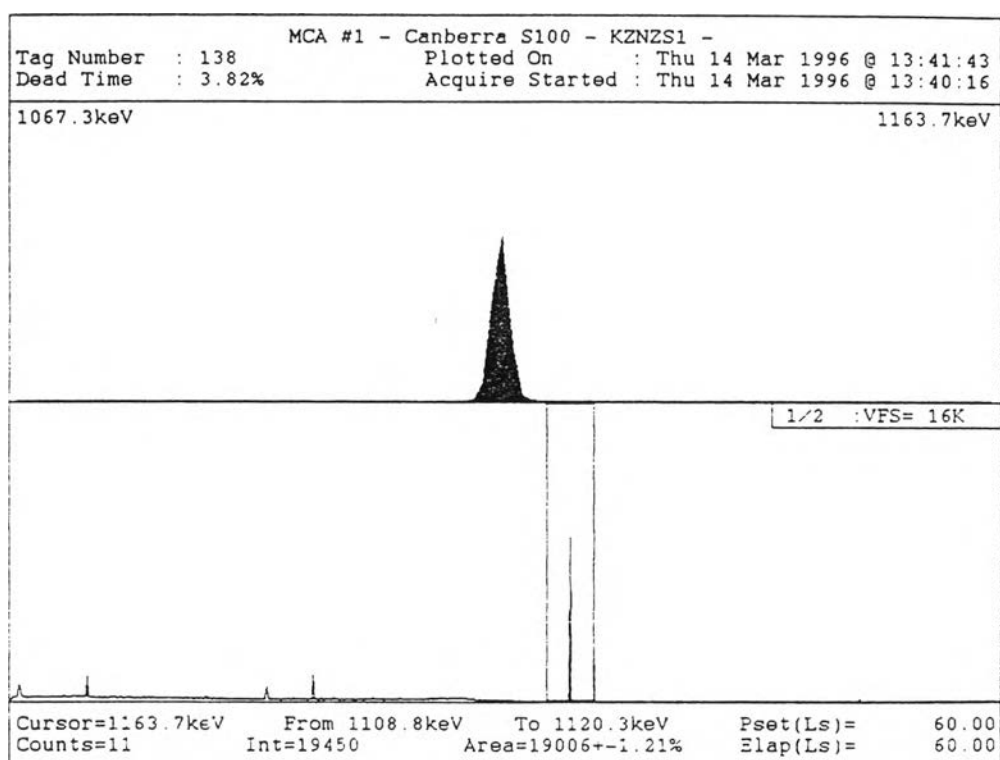


Figure A-10 Gamma ray spectrum of zinc in the char residue from flame retarding polypropylene containing 5% ZS and 10% DBDPO.

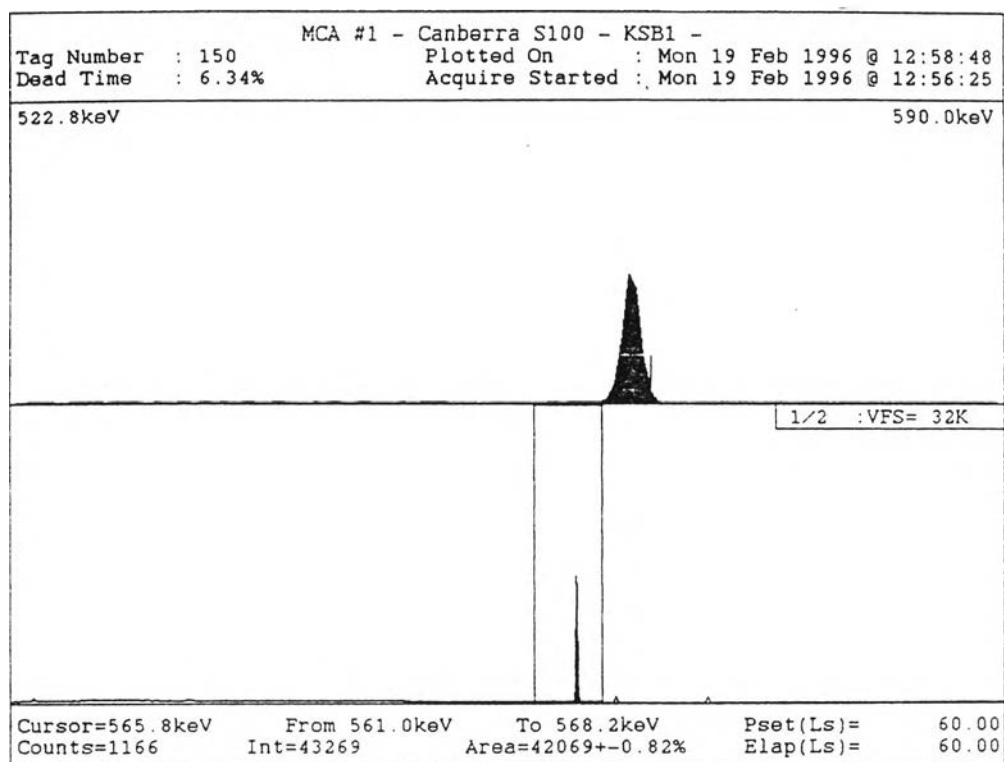


Figure A-11 Gamma ray spectrum of antimony in standard antimony trioxide.

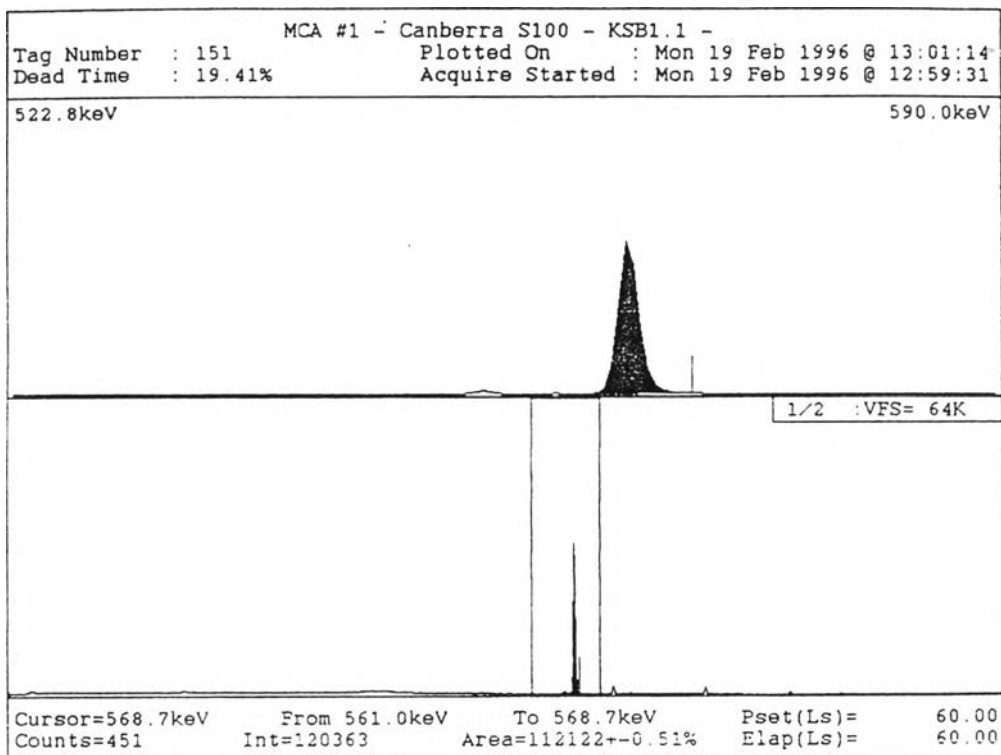


Figure A-12 Gamma ray spectrum of antimony in the char residue from flame retarding polypropylene containing 5% Sb_2O_3 and 10% DBDPO.

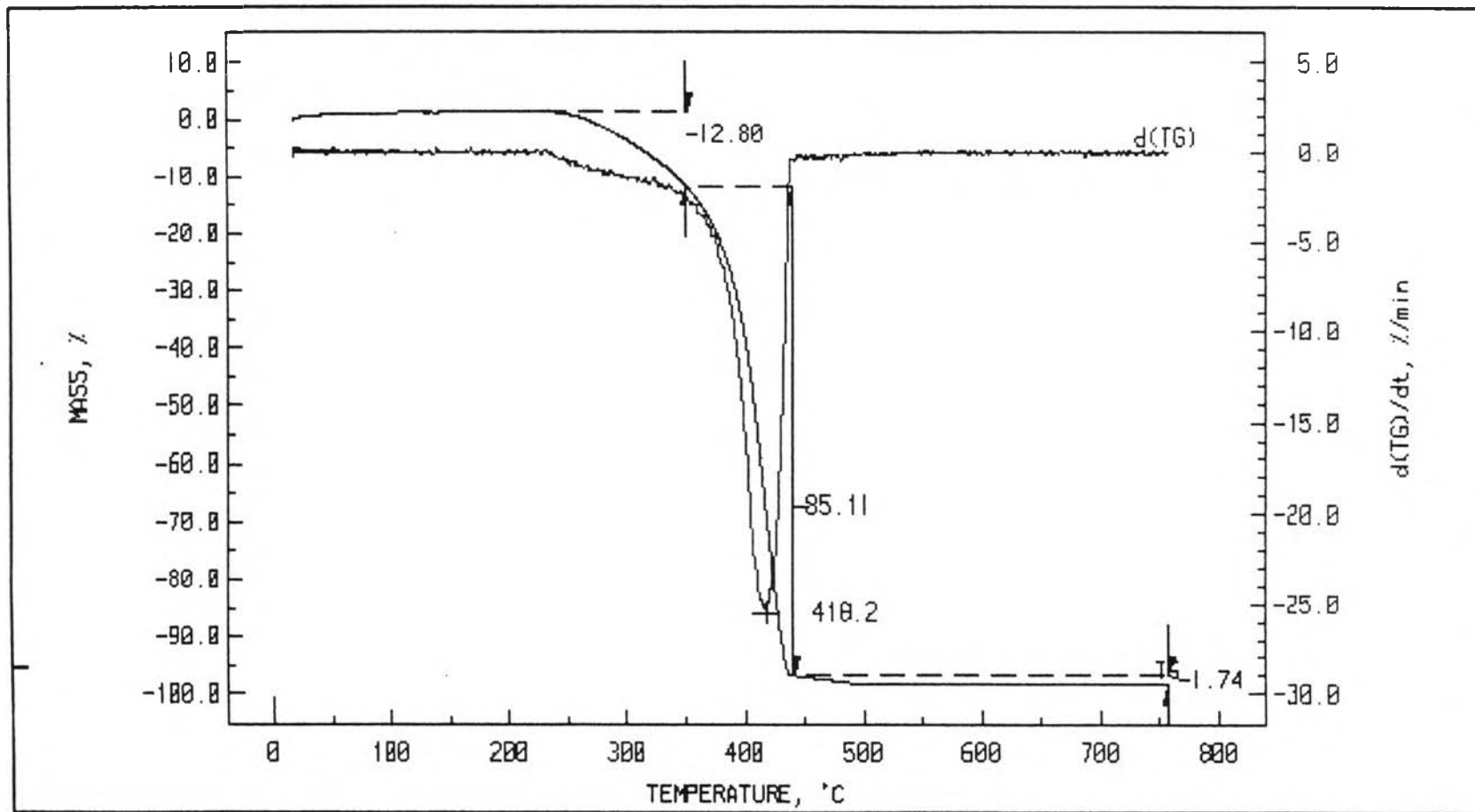


Figure A-13 TG/DTG Curve for polypropylene containing 10% DBDPO.

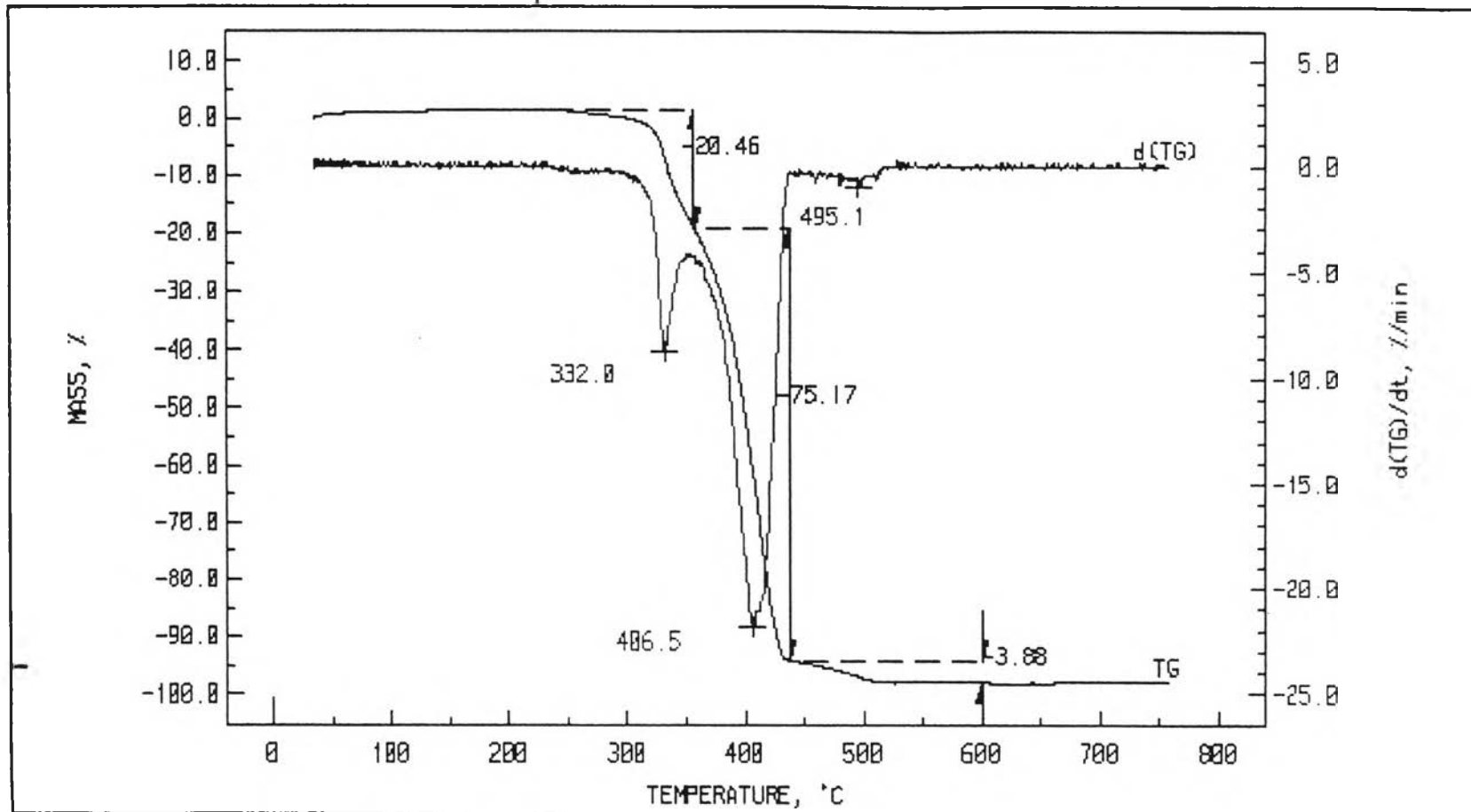


Figure A-14 TG/DTG Curve for polypropylene containing 10% DBDPO and 5% Sb₂O₃.

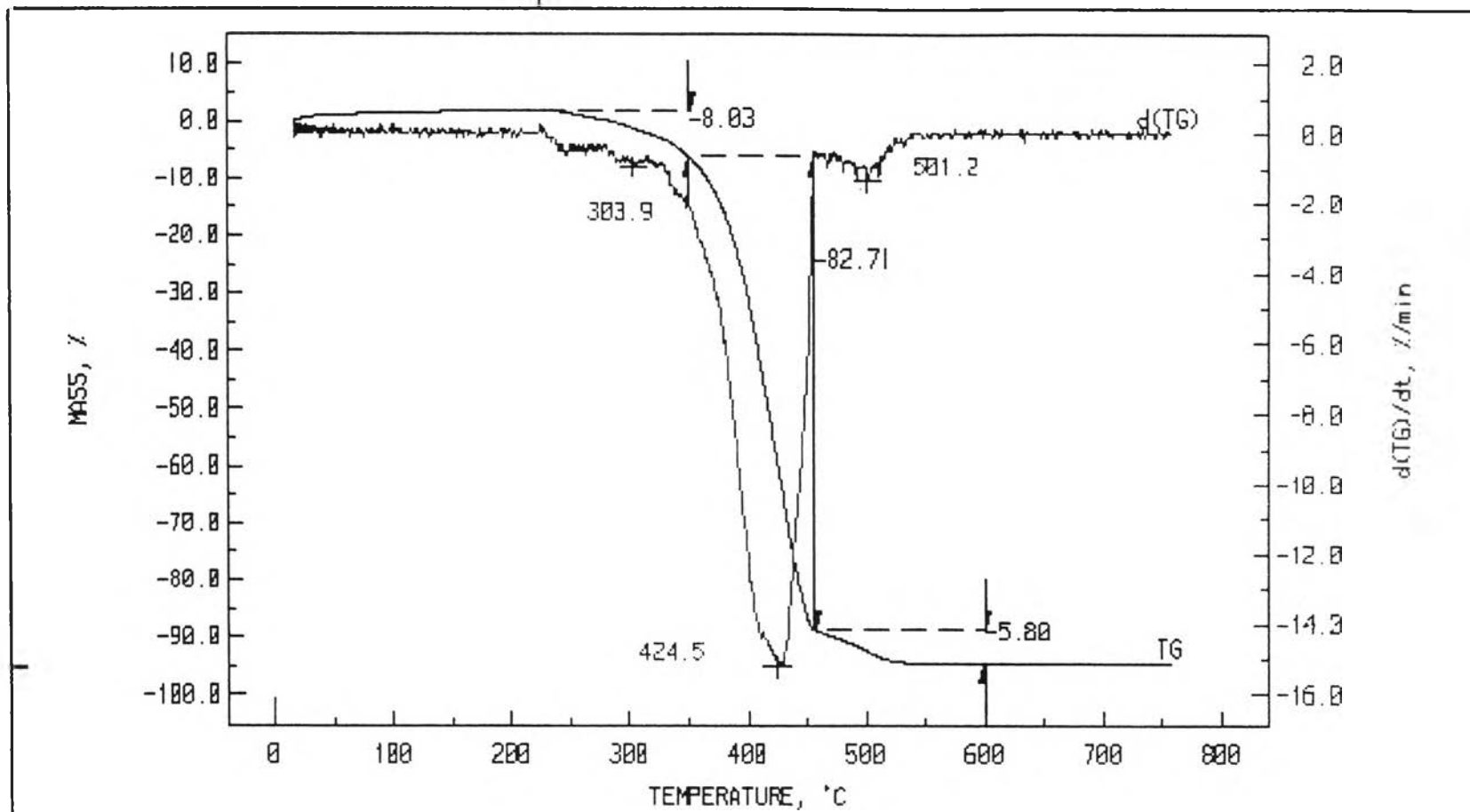


Figure A-15 TG/DTG Curve for polypropylene containing 10% DBDPO and 5% ZS.

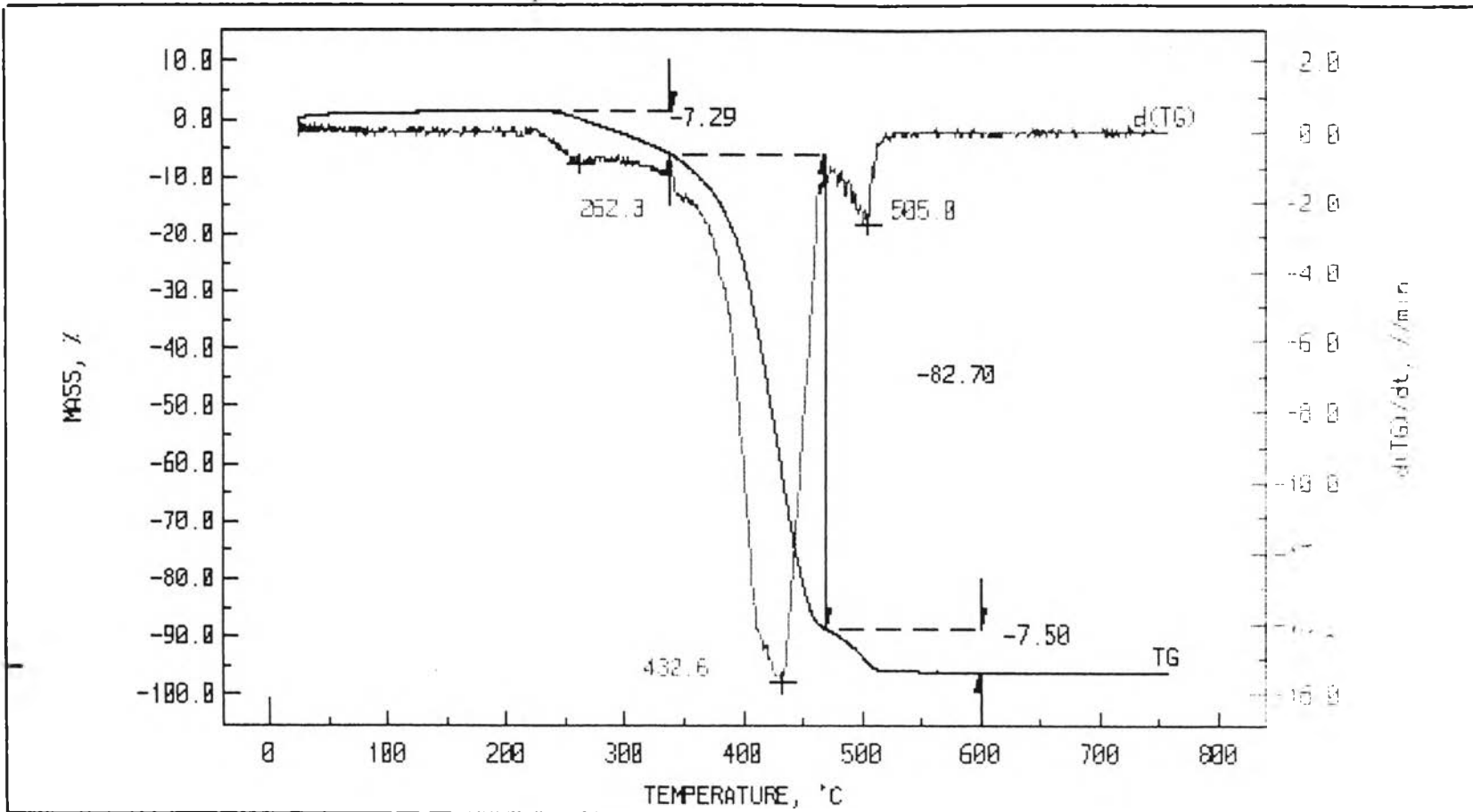


Figure A-16 TG/DTG Curve for polypropylene containing 10% DBDPO and 5% ZHS.

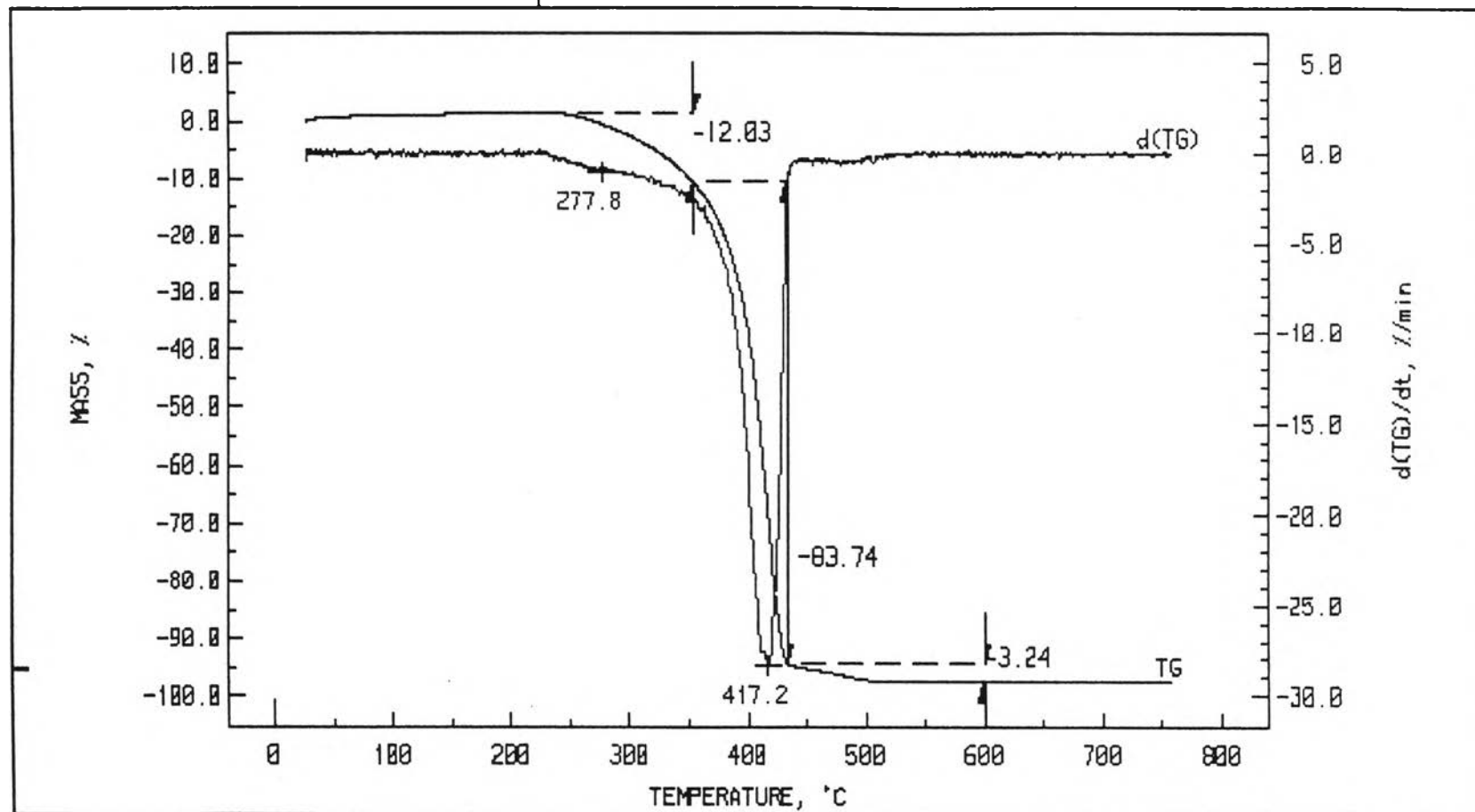


Figure A-17 TG/DTG Curve for polypropylene containing 20% DBDPO.

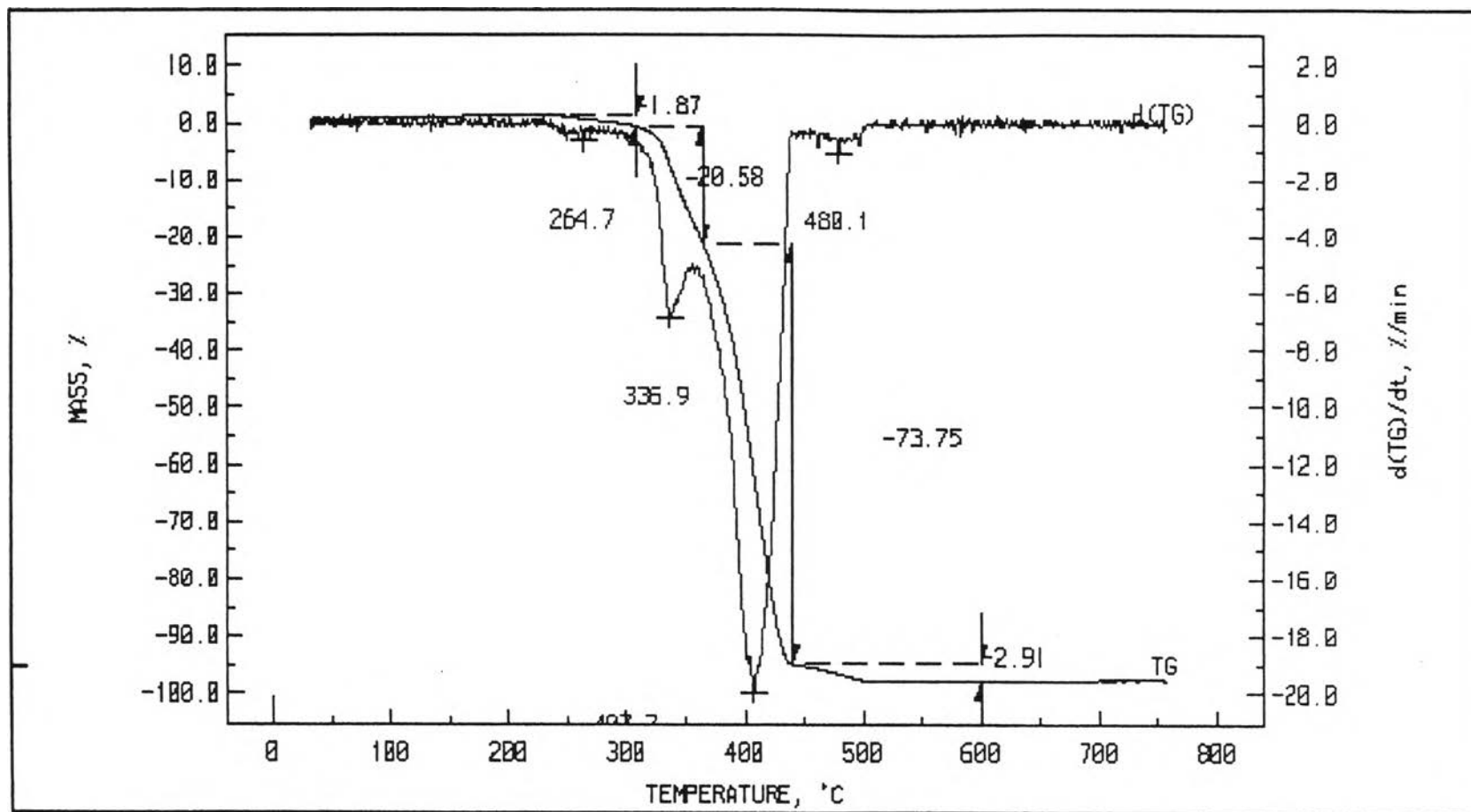


Figure A-18 TG/DTG Curve for polypropylene containing 20% DBDPO and 5% Sb_2O_3 .

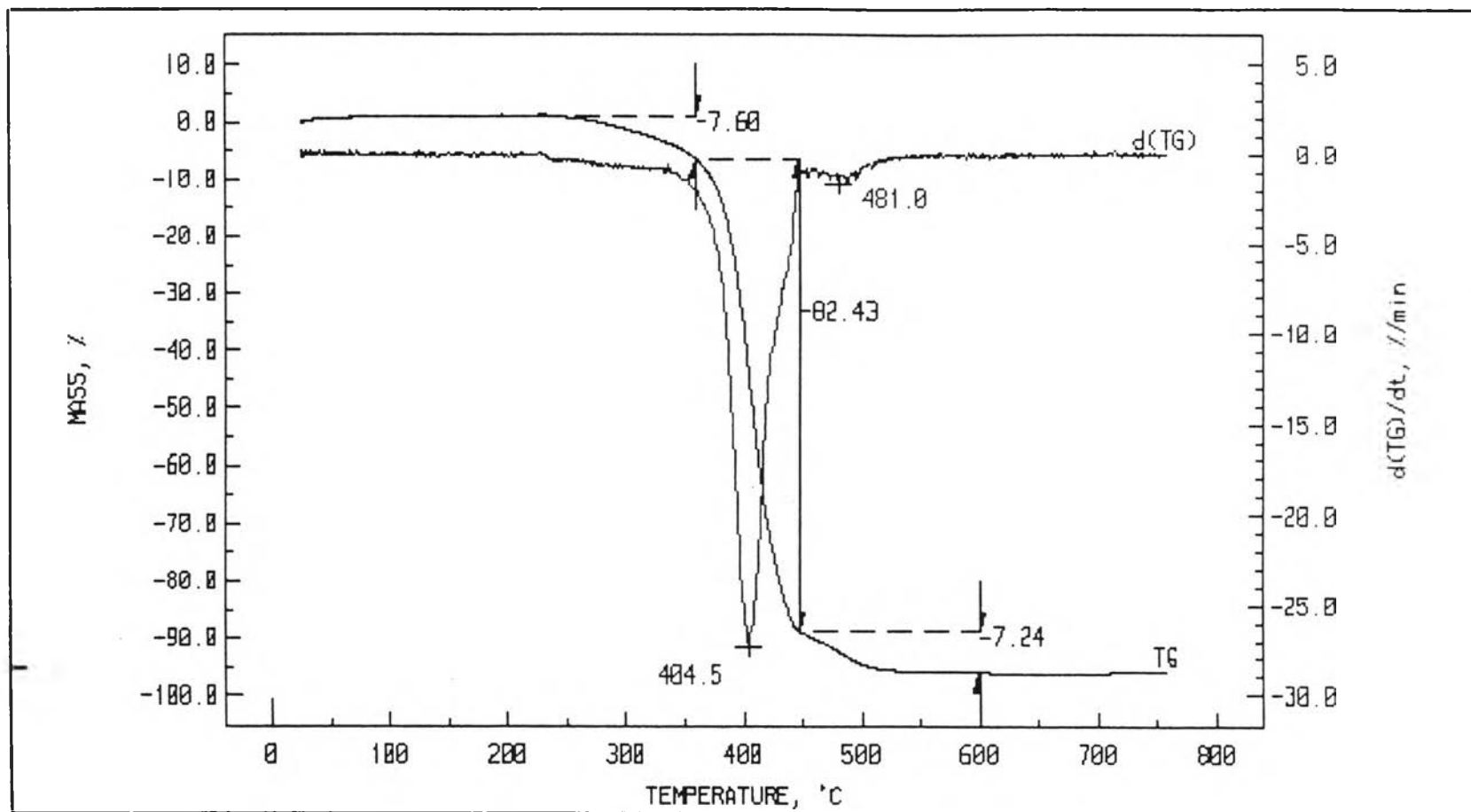


Figure A-19 TG/DTG Curve for polypropylene containing 20% DBDPO and 5% ZS.

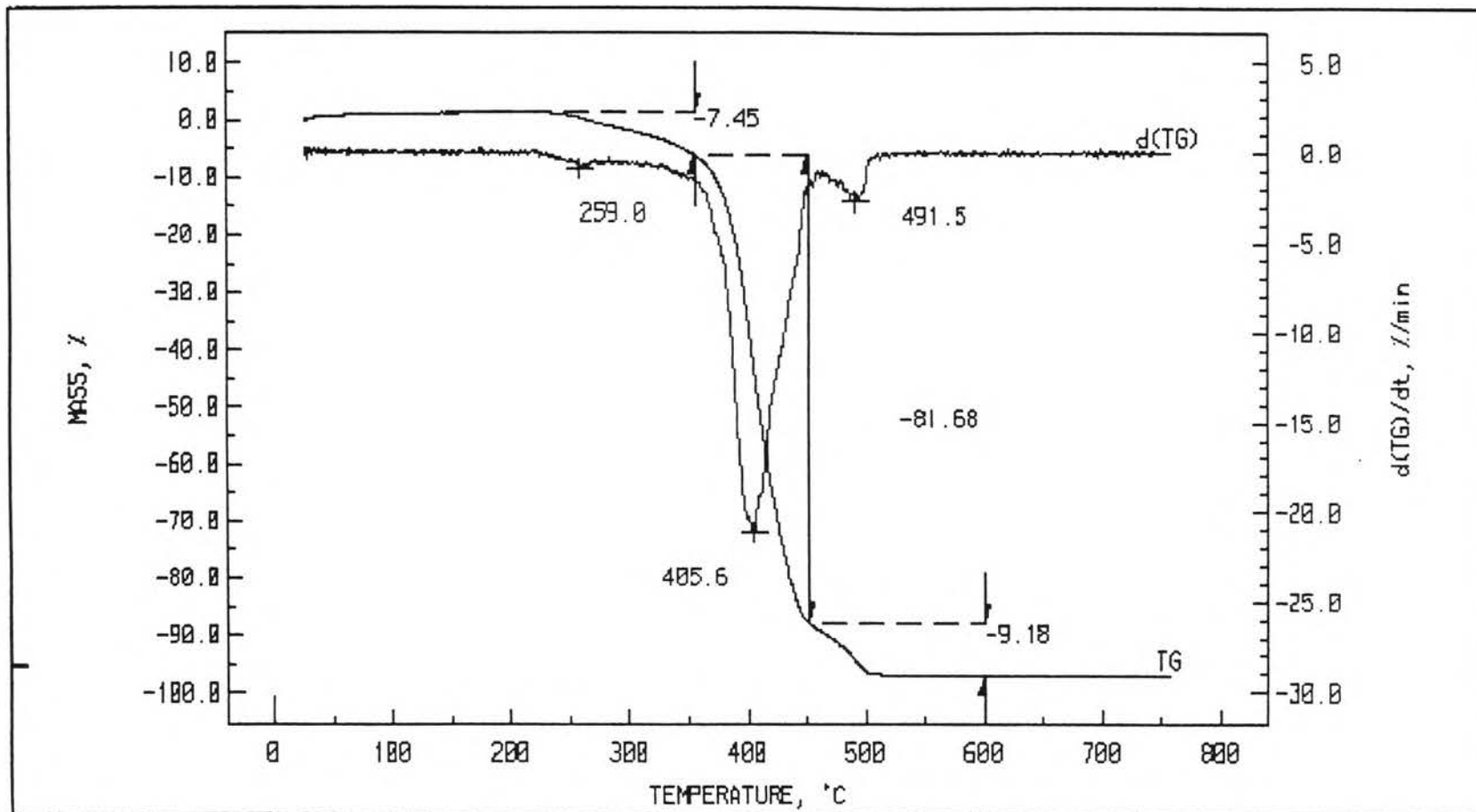


Figure A-20 TG/DTG Curve for polypropylene containing 20% DBDPO and 5% ZHS.



VITA

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