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## APPENDICES

### Appendix I : The Standard Solution for AAS

Sodium chloride 99.99% was used for preparation standard solution. The 2.542 g of dried NaCl was dissolved in water and diluted to 1 liter to give 1000  $\mu\text{g}/\text{ml}$  of Na ion stock solution. The standard sodium solution of 40 ppm was prepared by dilution 10 ml of stock solution into 250 ml of volumetric flask. This 40 ppm of sodium standard solution was diluted to 10 and 8 ppm by dilution 25 ml of 40 ppm into 100 ml of volumetric flask and 10 ml of 40 ppm into 50 ml of volumetric flask, respectively. These two standard solutions of 8 and 10 ppm were used for preparation of 0.4, 0.8 and 1 ppm standard solution that used for preparation the calibration curve. The example of calibration curve show in the Figure I.1.

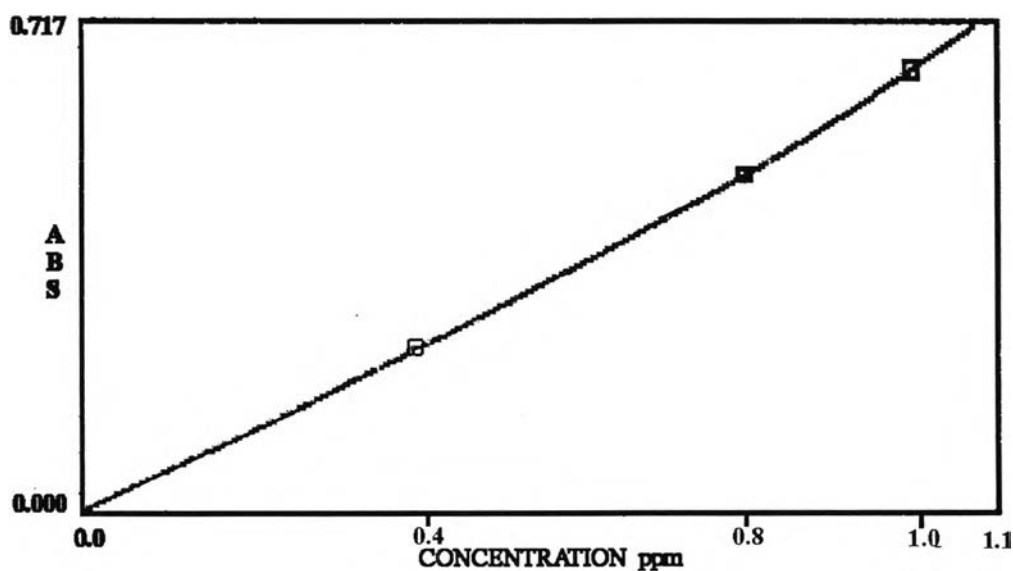


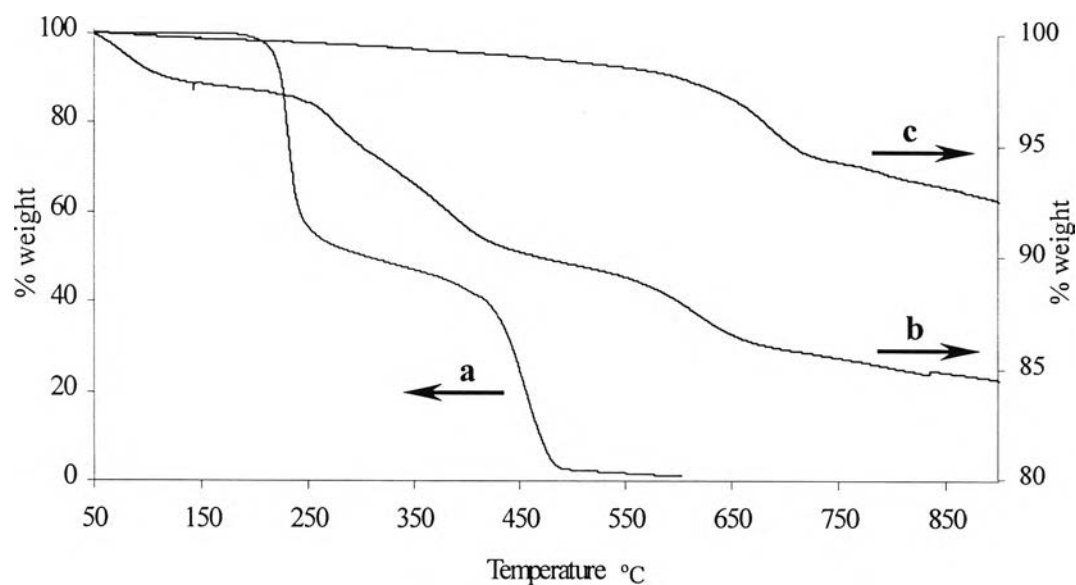
Figure I.1 The calibration curve of standard sodium solution of AAS.

Sample solution was taken from the supernatant part in the preparation of OMOM. This solution was diluted into 1000 times and used it as sample solution in AAS.

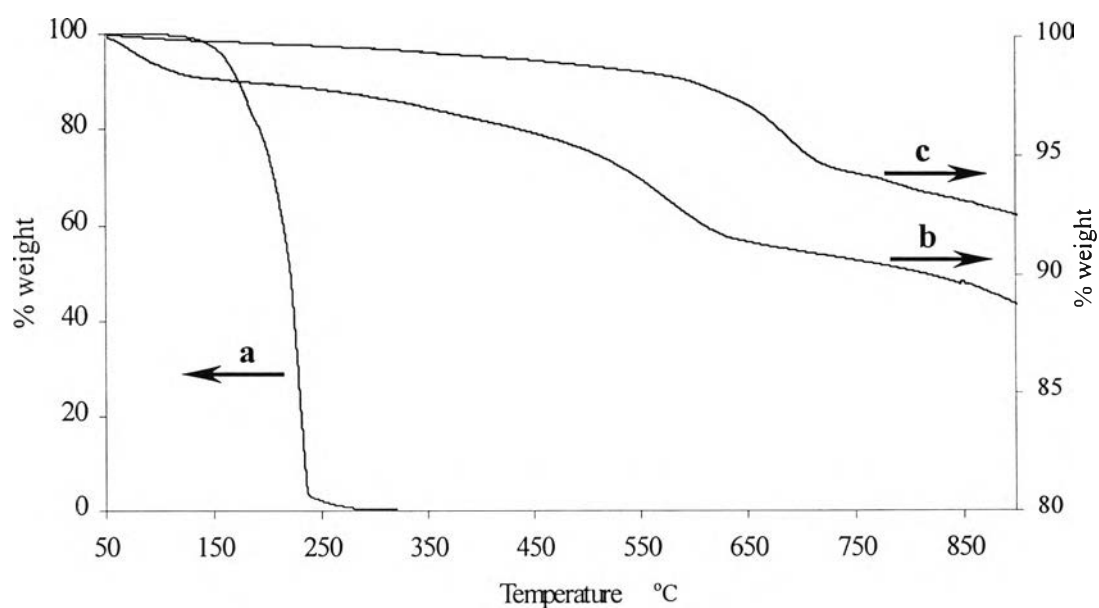
The percentage of Na<sup>+</sup> ion exchanged in OMOM was calculated by the following equation.

$$\% \text{ Na}^+ \text{ ion exchanged} = \frac{\text{Amount of Na}^+ \text{ ion in the solution (from AAS)}}{\text{Weight of montmorillonite} \times 119e^{-5}} \times 100$$

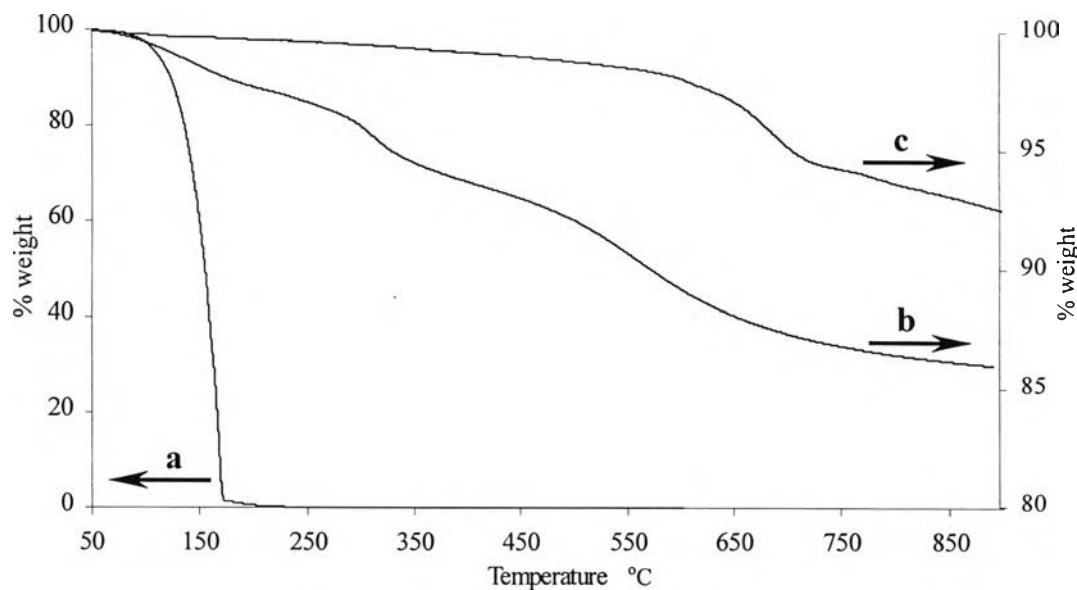
**Appendix II : TGA Thermograms of Characterization of Various types of Organically Modified Montmorillonite (OMOM)**



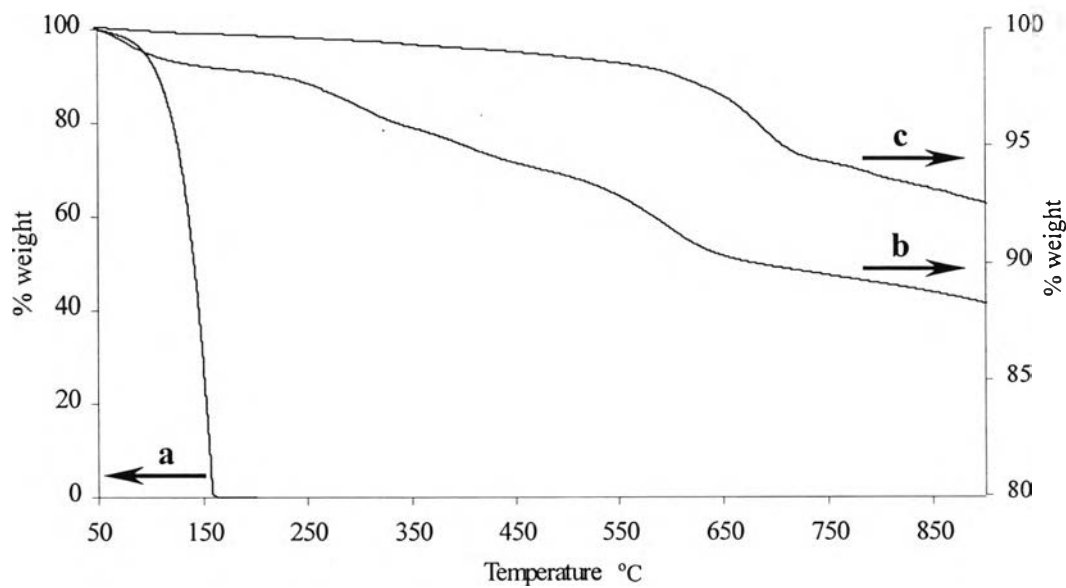
**Figure II.1 TGA thermograms of (a) CAPRO, (b) MOM\_CAPRO and (c) montmorillonite.**



**Figure II.2 TGA thermograms of (a) ANDAD, (b) MOM\_ANDAD and (c) montmorillonite.**



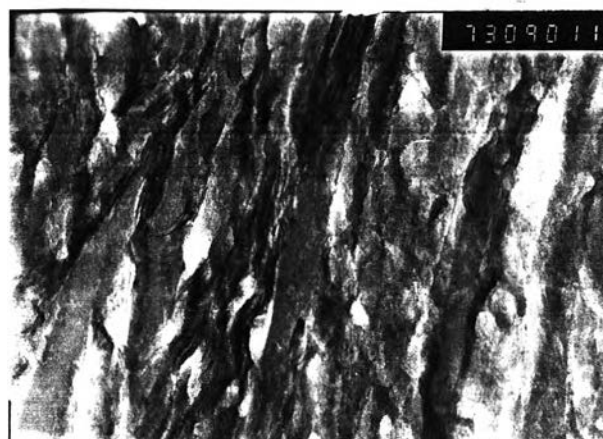
**Figure II.3** TGA thermograms of (a) PHEN, (b) MOM\_PHEN and (c) montmorillonite.



**Figure II.4** TGA thermograms of (a) TMAN, (b) MOM\_TMAN and (c) montmorillonite.



**Appendix III : Transmission Electron Micrographs of Polybenzoxazine Composite Films**



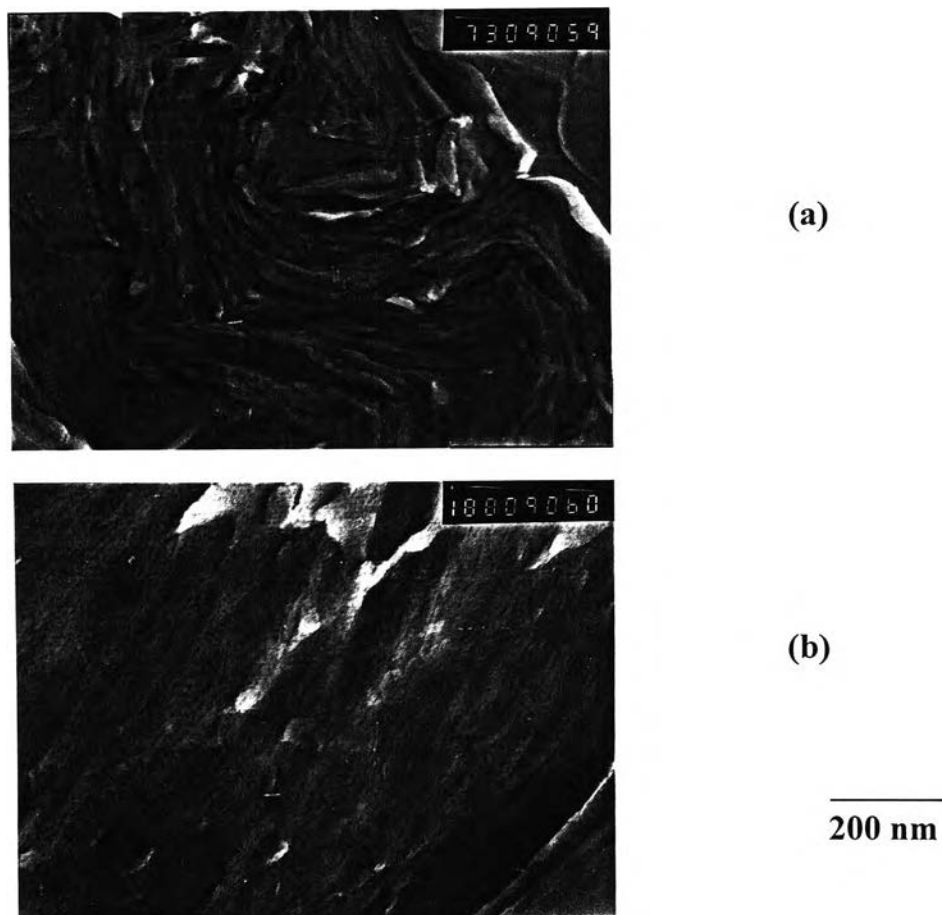
(a)



(b)

200 nm

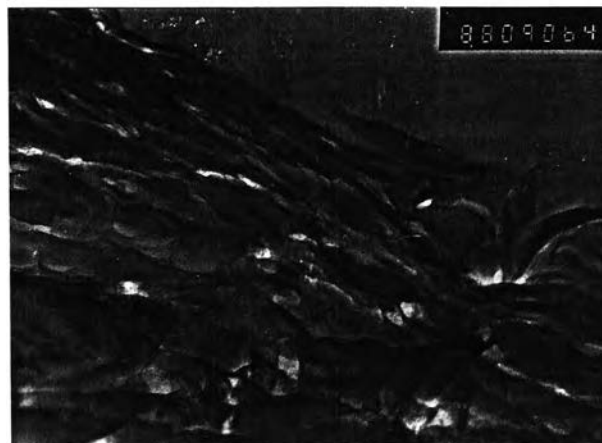
**Figure III.1** Transmission electron micrographs of polybenzoxazine composite of (a) MOM\_DODEC and (b) MOM\_TMAN via dioxane solvent.



**Figure III.2** Transmission electron micrographs of polybenzoxazine composite of (a) MOM\_DODEC and (b) MOM\_TMAN via toluene solvent.



(a)



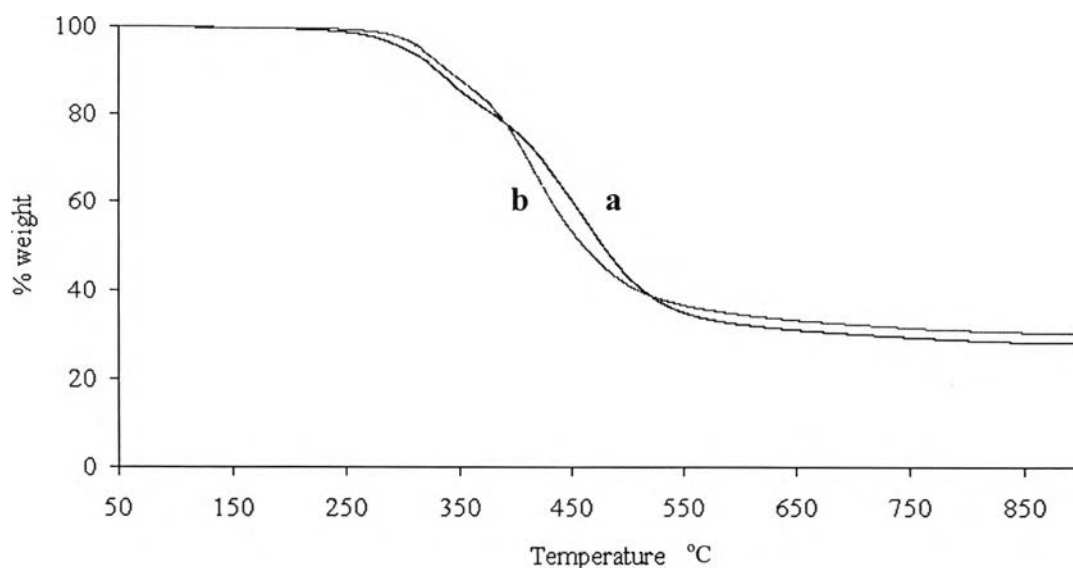
(b)

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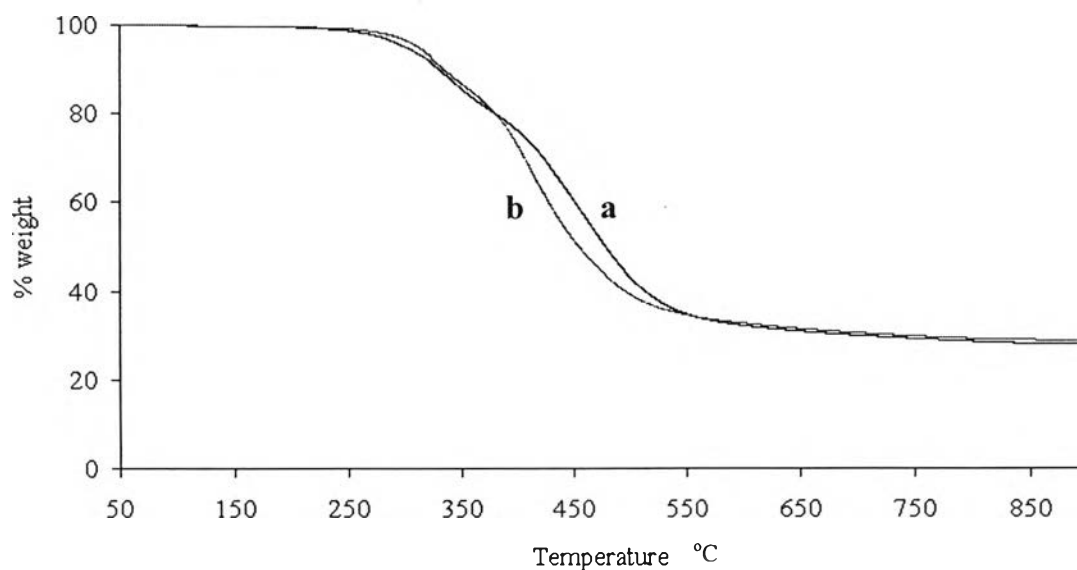
200 nm

**Figure III.3** Transmission electron micrographs of polybenzoxazine composite of (a) MOM\_DODEC and (b) MOM\_TMAN via binary solvent of 5% of methanol in toluene.

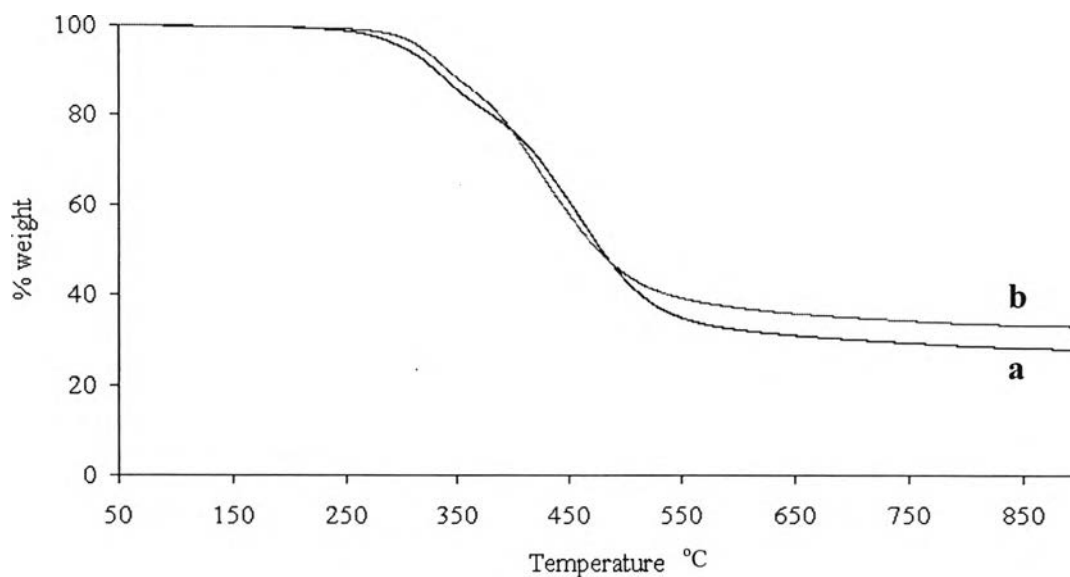
**Appendix IV : TGA Thermograms of Composite Films Compared with Polybenzoxazine Film**



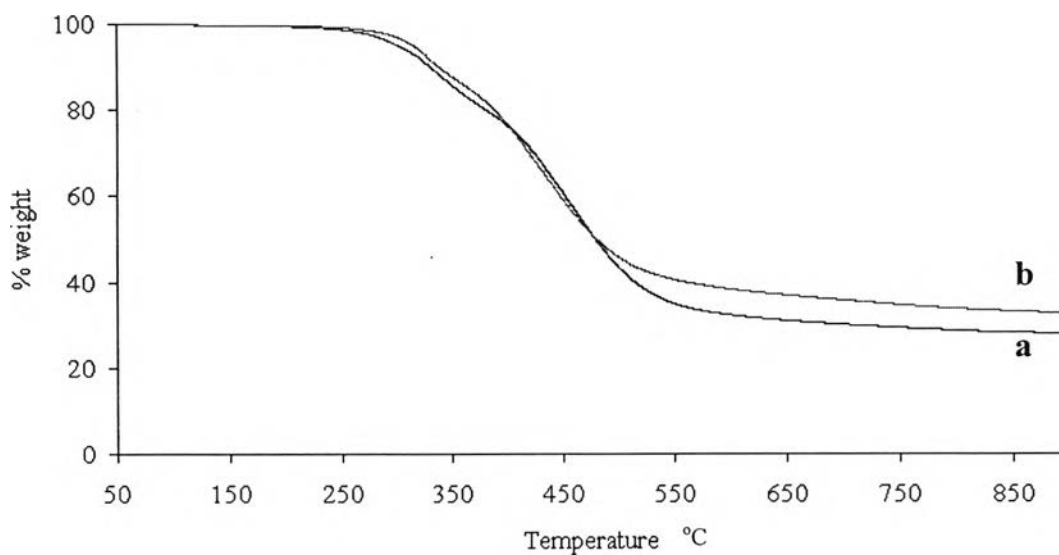
**Figure IV.1 TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_DODEC of non-solvent system.**



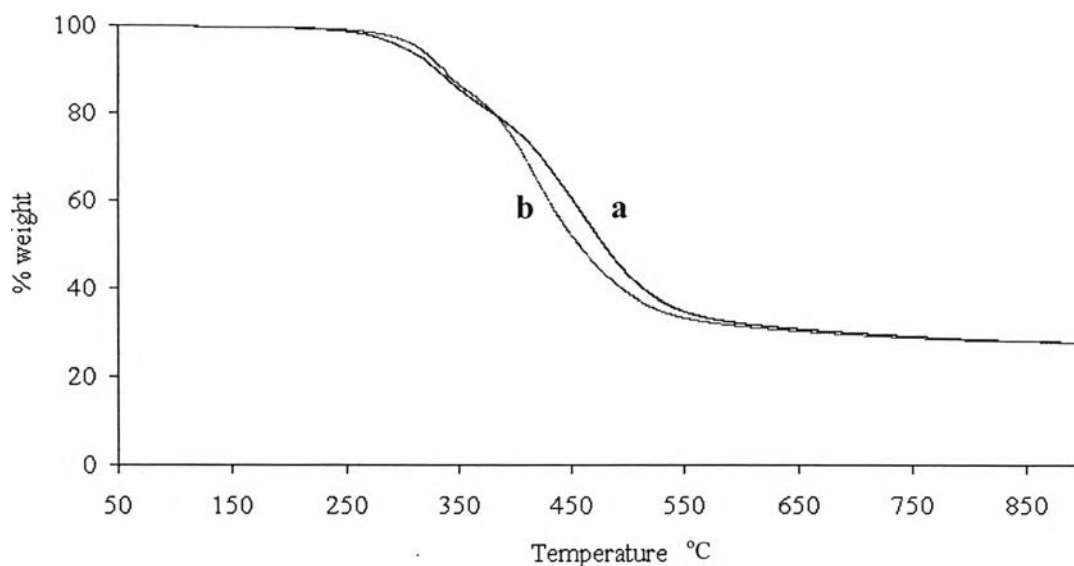
**Figure IV.2 TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_TMAN of non-solvent system.**



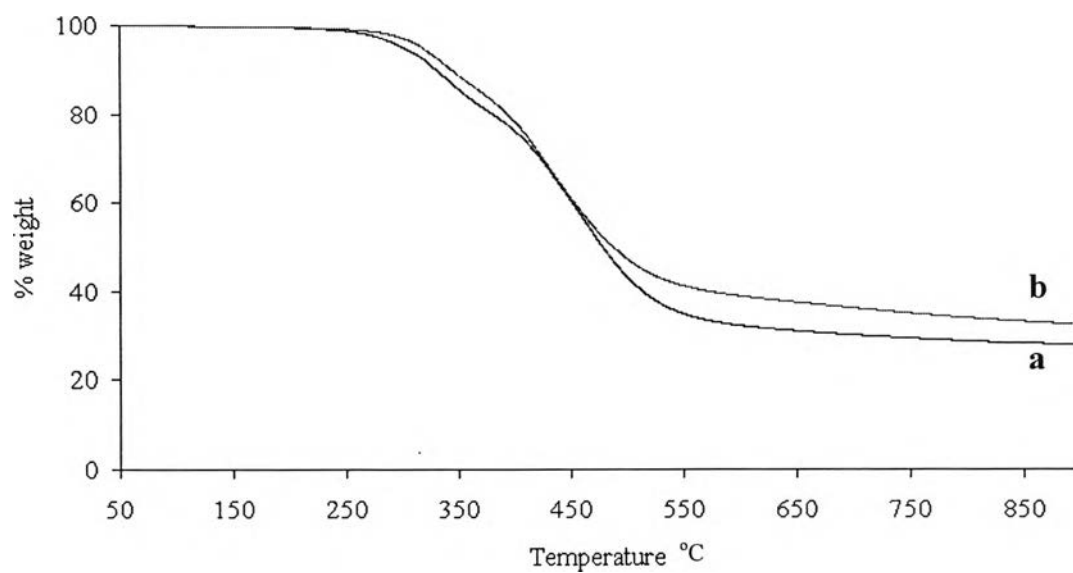
**Figure IV.3 TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_ANDAD of non-solvent system.**



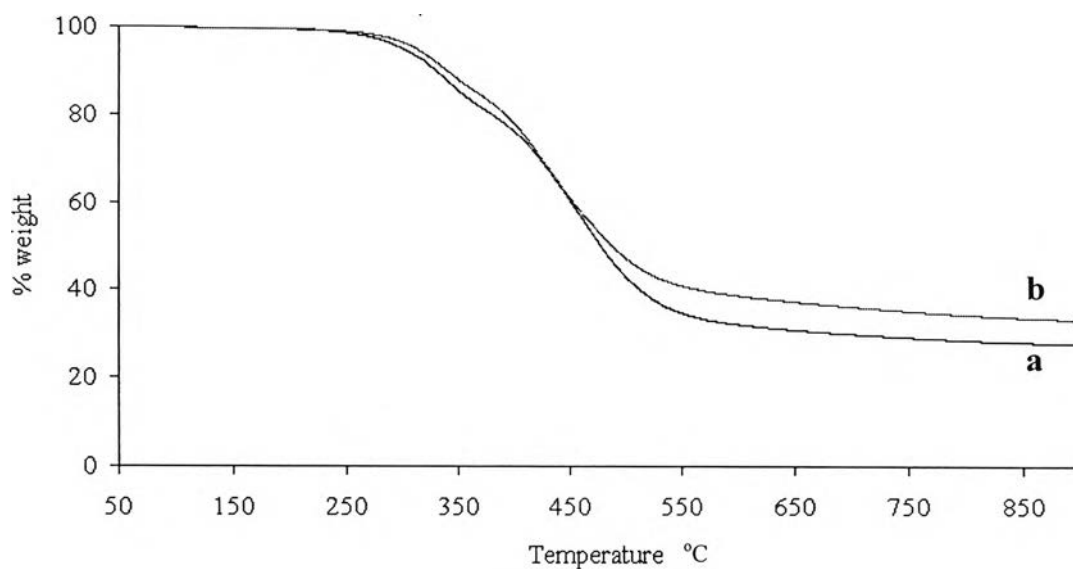
**Figure IV.4 TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_PHEN of non-solvent system.**



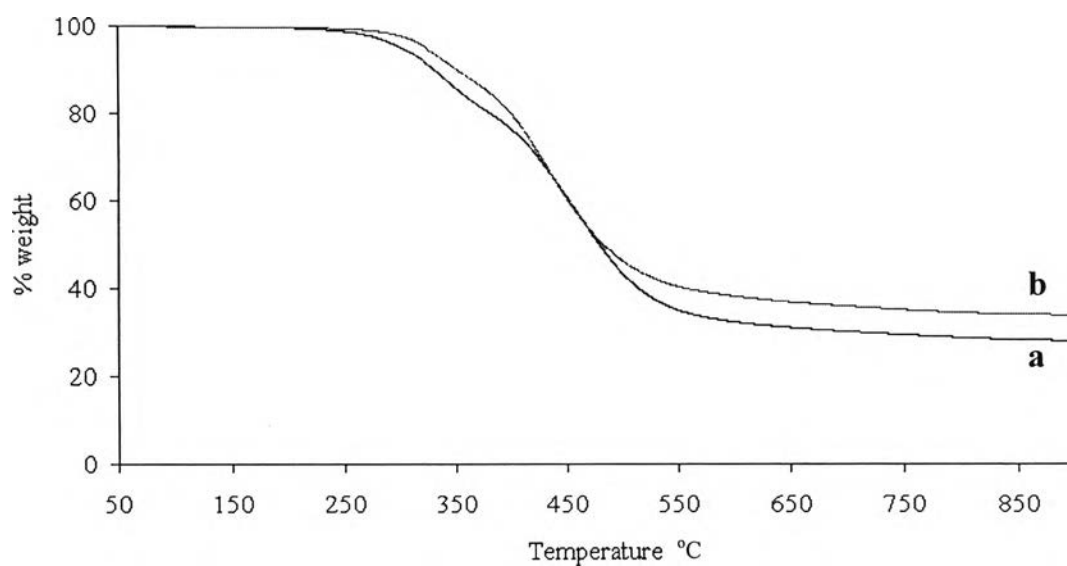
**Figure IV.5** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_CAPRO of non-solvent system.



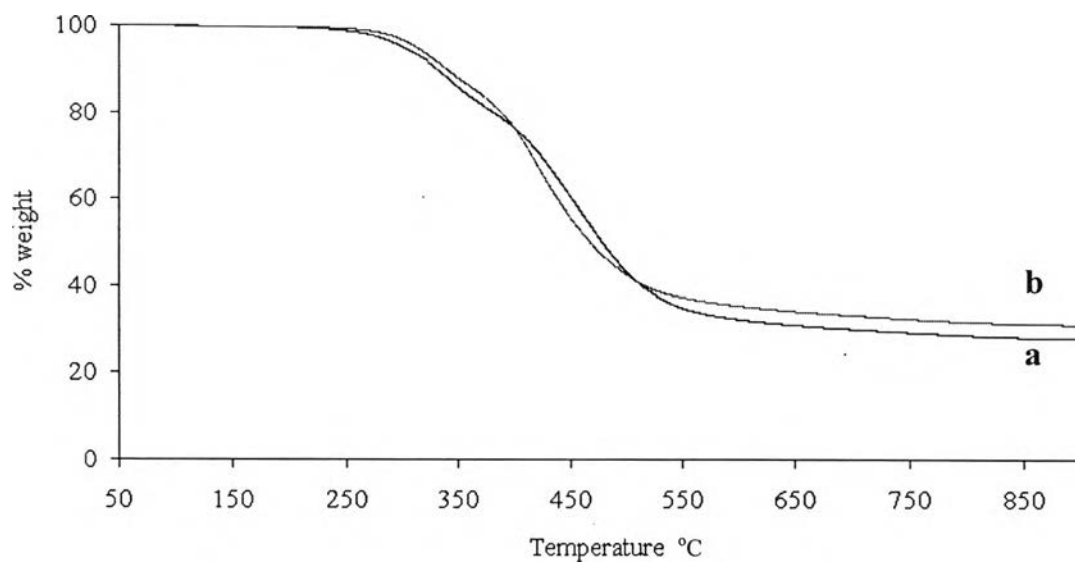
**Figure IV.6** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_DODEC of dioxane solvent system.



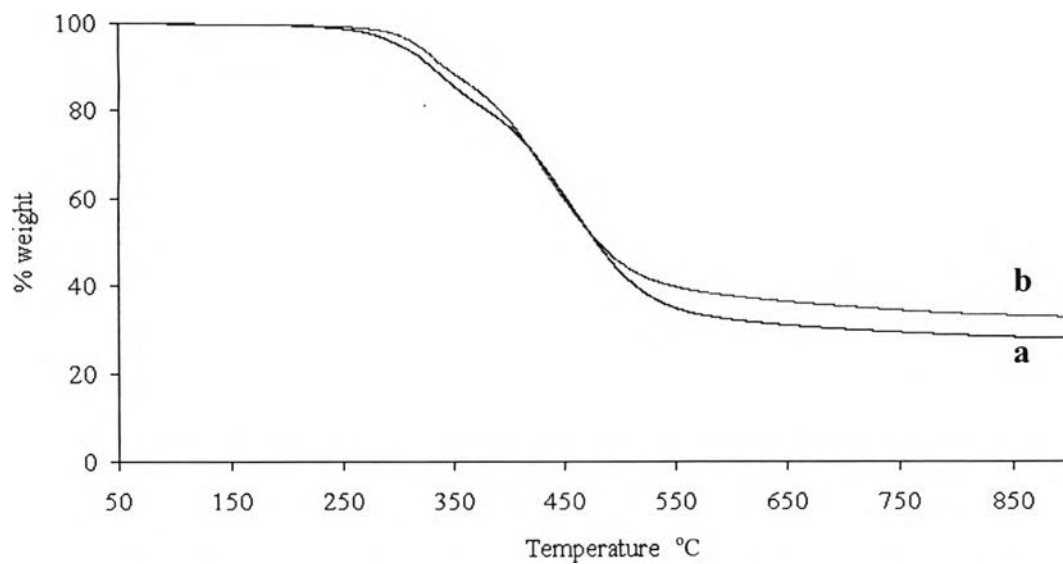
**Figure IV.7 TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_TMAN of dioxane solvent system.**



**Figure IV.8 TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_ANDAD of dioxane solvent system.**

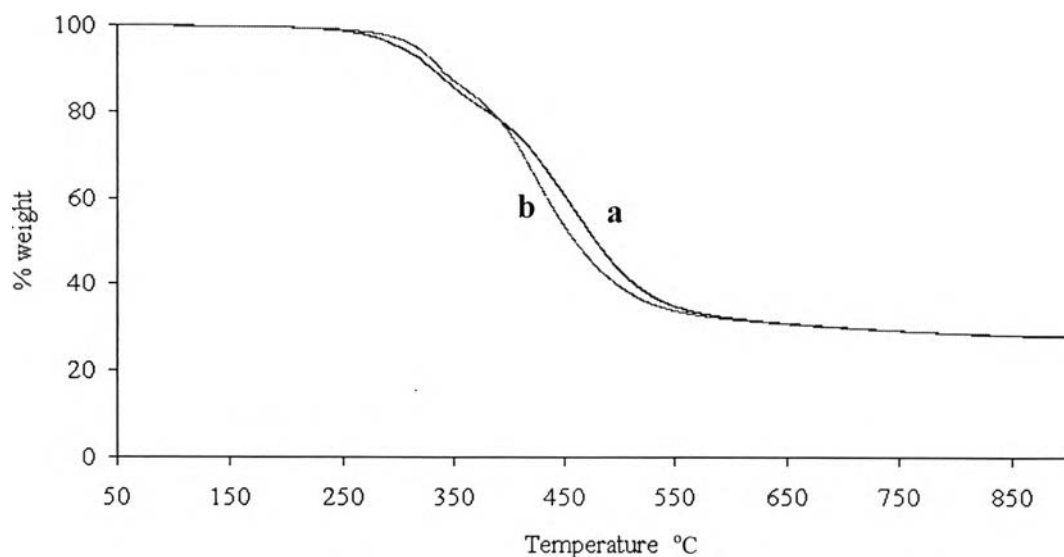


**Figure IV.9** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_PHEN of dioxane solvent system.

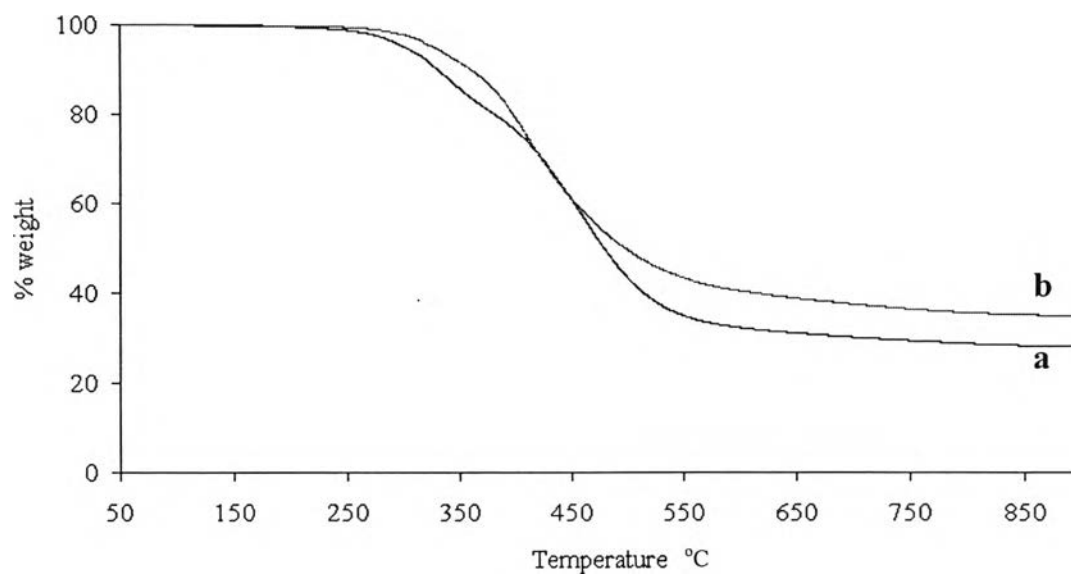


**Figure IV.10** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_CAPRO of dioxane solvent system.

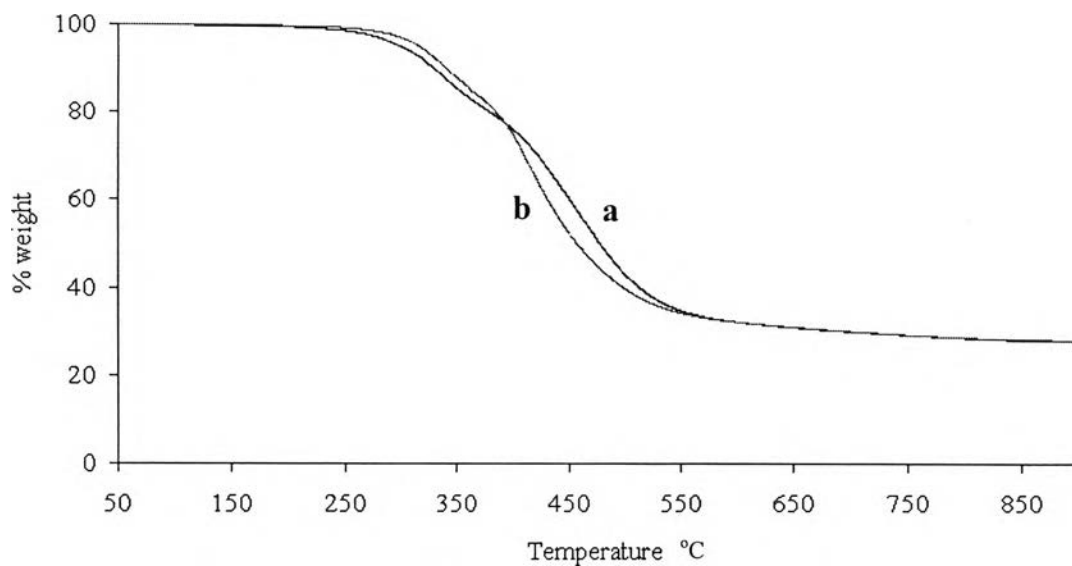




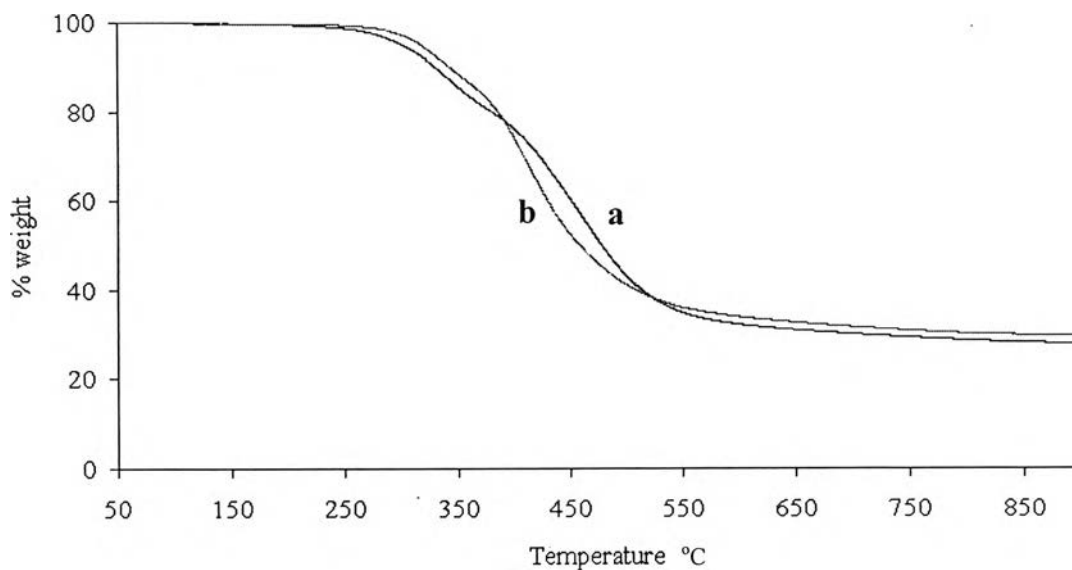
**Figure IV.11** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_DODEC of toluene solvent system.



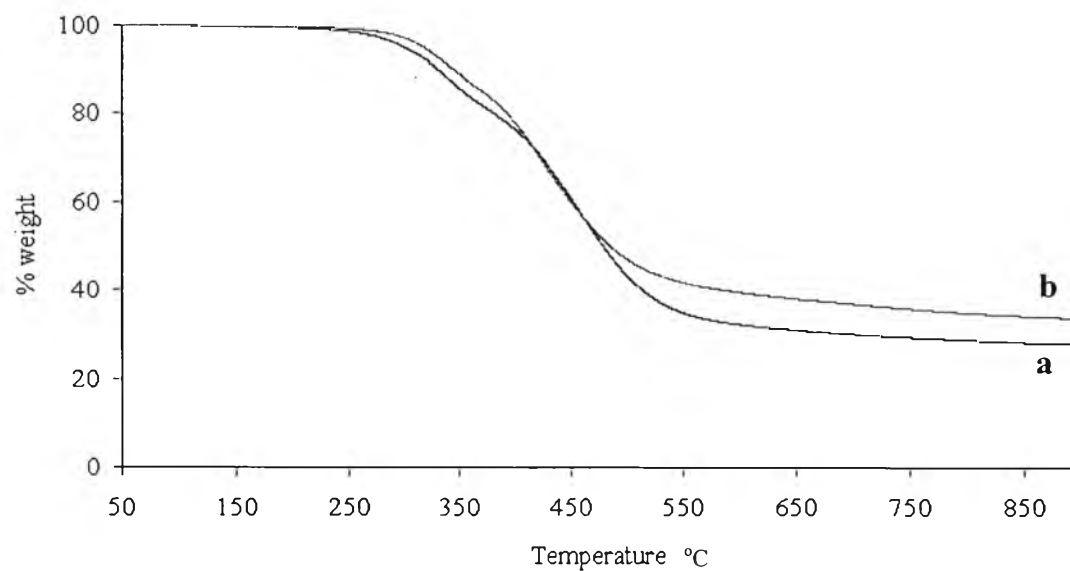
**Figure IV.12** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_TMAN of toluene solvent system.



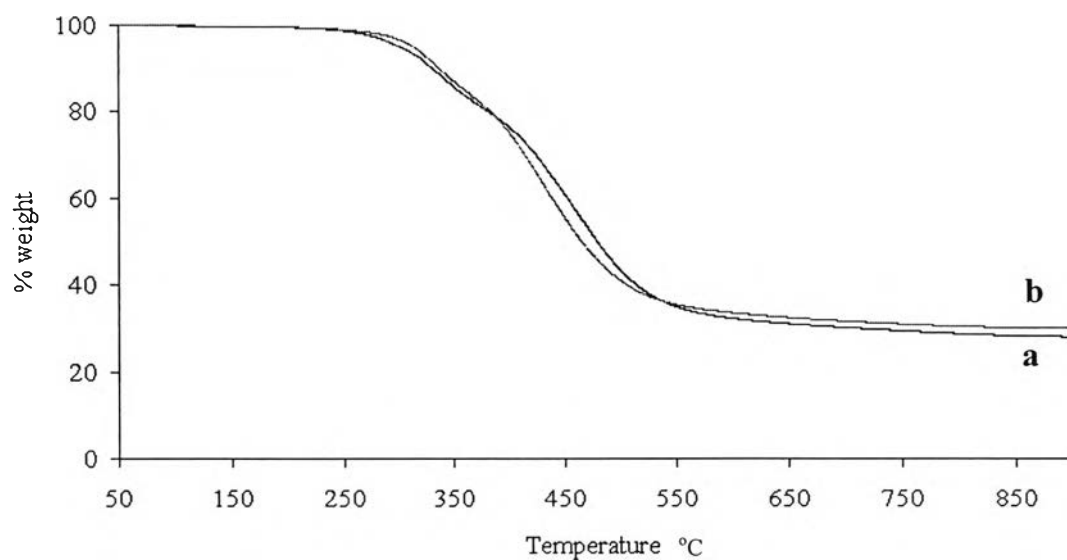
**Figure IV.13** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_ANDAD of toluene solvent system.



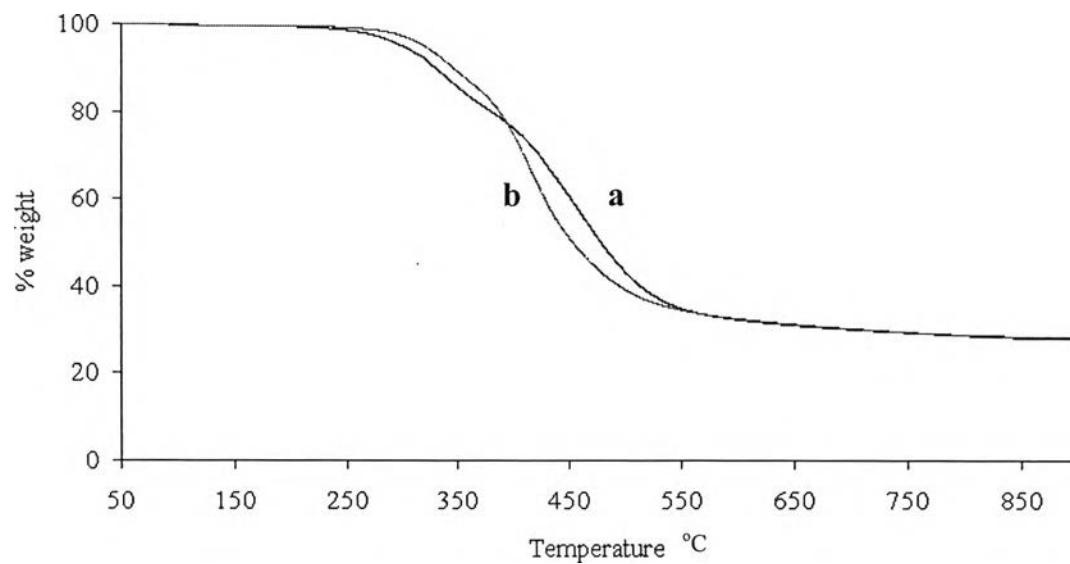
**Figure IV.14** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_PHEN of toluene solvent system.



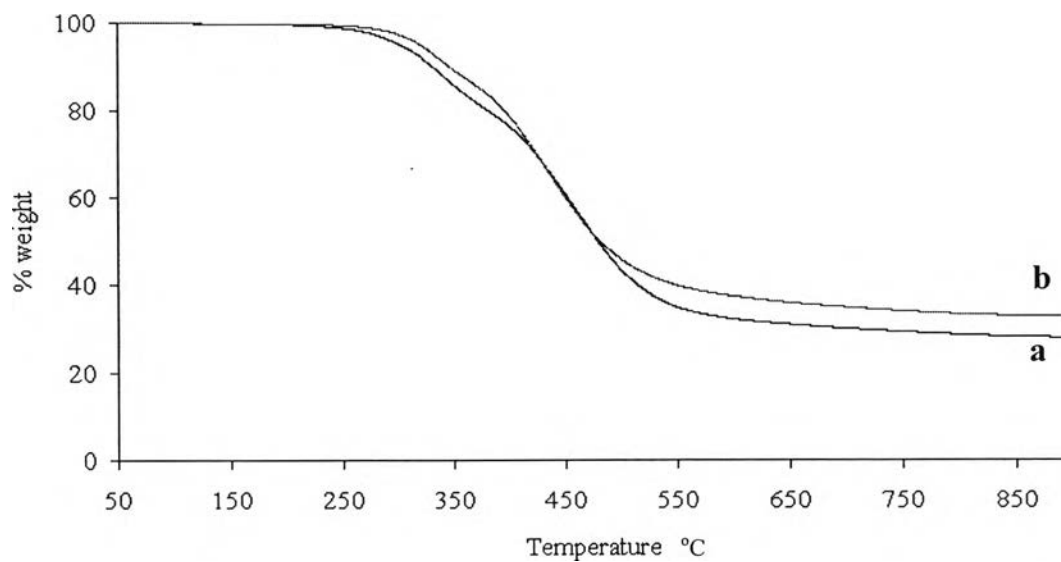
**Figure IV.15** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_CAPRO of toluene solvent system.



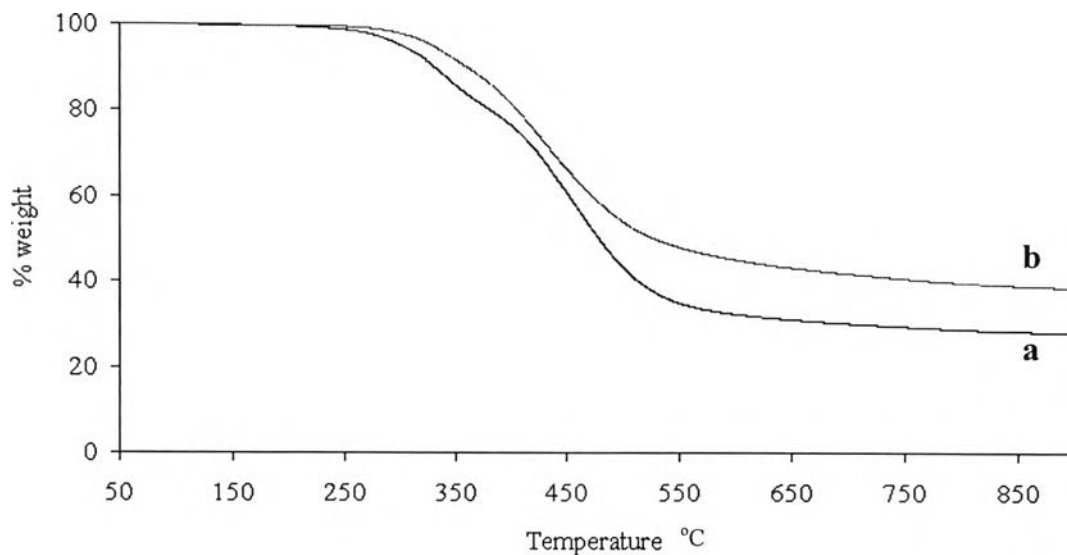
**Figure IV.16** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_DODEC of binary solvent system.



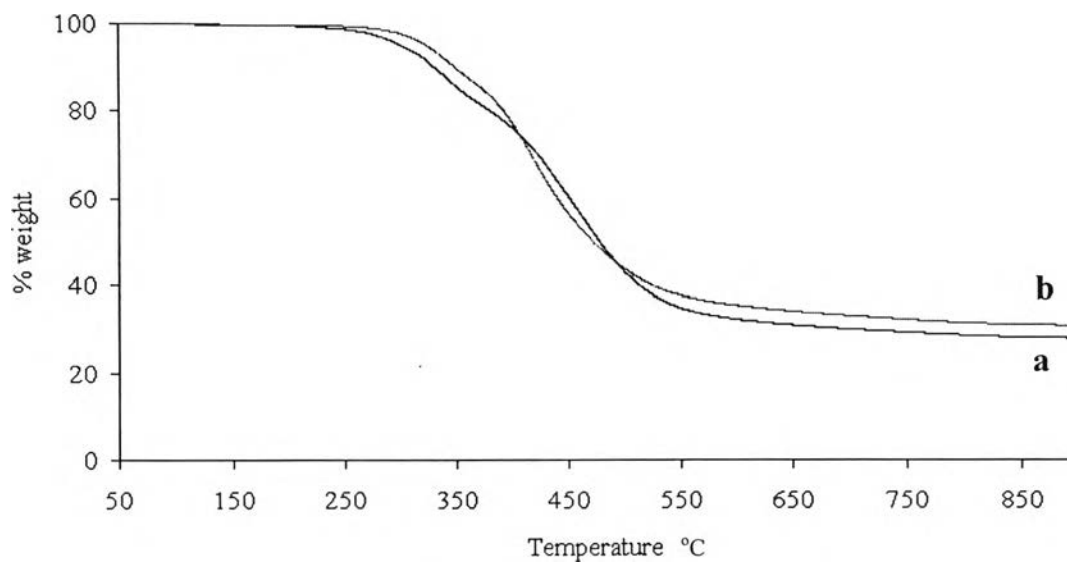
**Figure IV.17** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_TMAN of binary solvent system.



**Figure IV.18** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_ANDAD of binary solvent system.

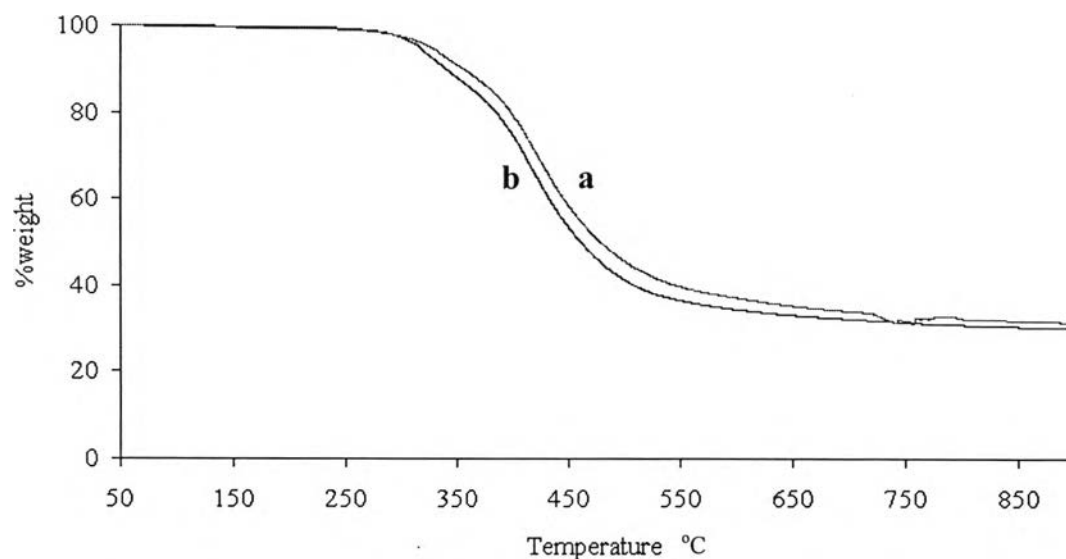


**Figure IV.19** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_PHEN of binary solvent system.

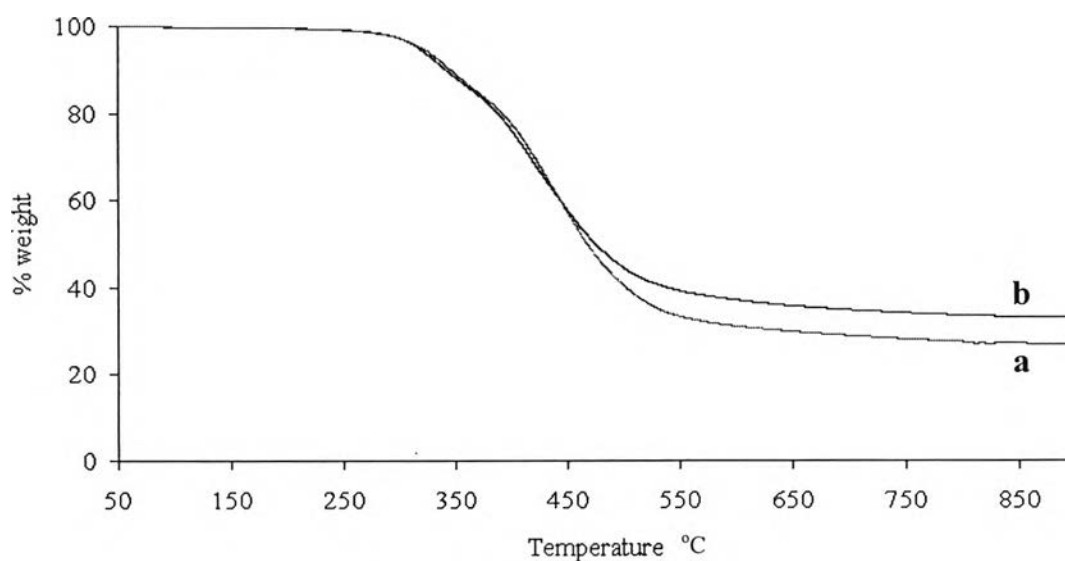


**Figure IV.20** TGA thermograms of (a) polybenzoxazine film and (b) the polybenzoxazine composite of MOM\_CAPRO of binary solvent system.

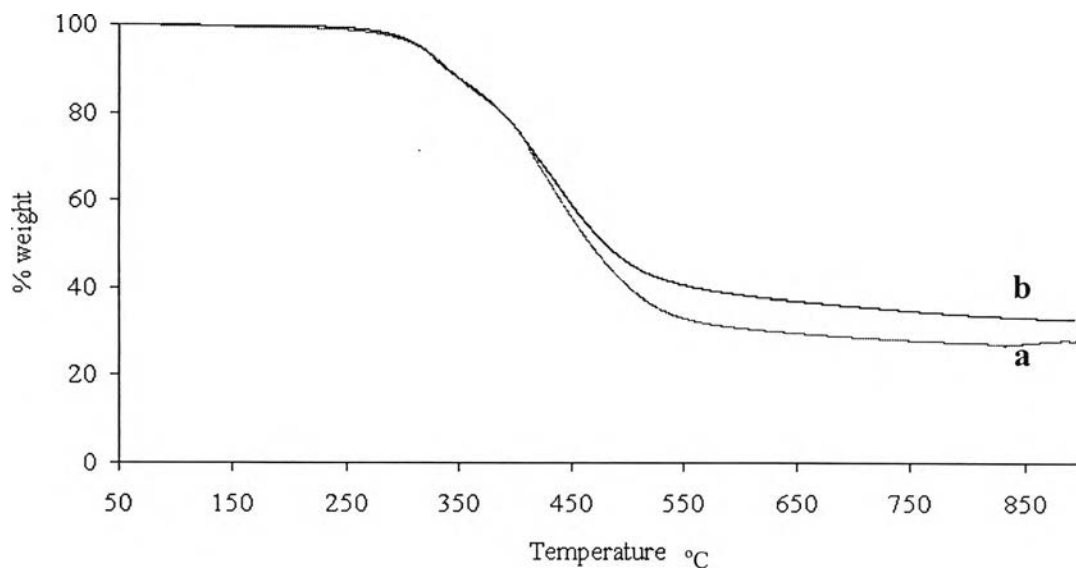
**Appendix V : TGA Thermograms of Wet Composite Films Compared with Dry Composite Films of Non Solvent System**



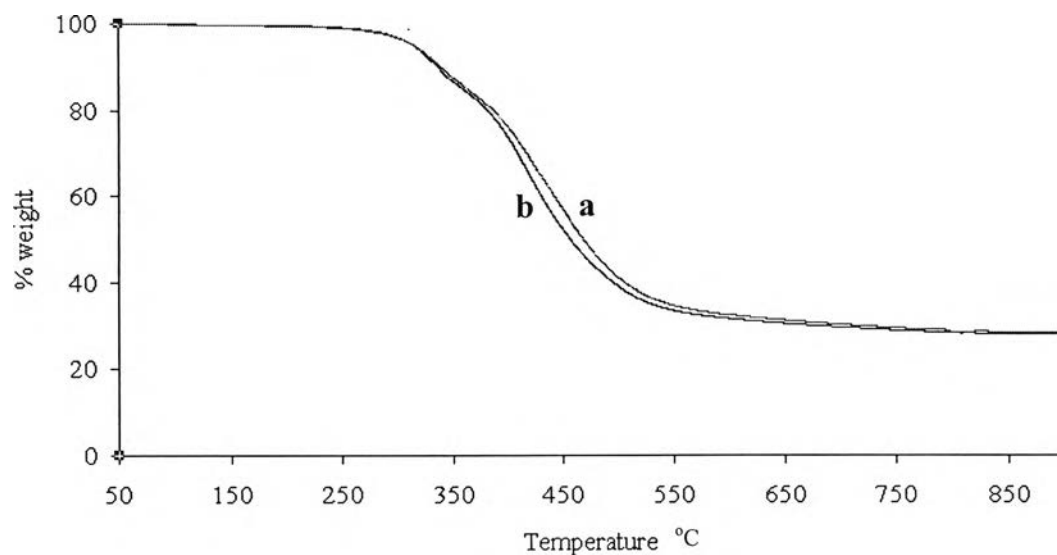
**Figure V.1 TGA thermograms of (a) water immersed and (b) not immersed 3% MOM\_DODEC-polybenzoxazine composite film.**



**Figure V.2 TGA thermograms of (a) water immersed and (b) not immersed 3% MOM\_ANDAD-polybenzoxazine composite film.**



**Figure V.3 TGA thermograms of (a) water immersed and (b) not immersed 3% MOM\_PHEN-polybenzoxazine composite film.**



**Figure V.4 TGA thermograms of (a) water immersed and (b) not immersed 3% MOM\_CAPRO-polybenzoxazine composite film.**

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