Preparation for colored PET films containing carbon black

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1. Introduction

Carbon black (CB) is commonly used in industrial materials such as seat belts and tire cords. One of advantages of CB is to provide black color to the materials with relatively low cost; however, CB just provide the only color, black. For diverse applications of CB including conductive materials, different colors would be required. In this research, PET films containing CB will be employed to change a color of the films with several types of dyes without serious reduction of properties and the color changes will be also measrued.

2. Experimental

2.1. Materials

PET chips (I. V. 0.660), Carbon black masterchip (PET:Carbon black, 9:1), C. I. Disperse yellow 79, Trifluoroacetic acid, Dichloroethane, Methanol

2.2. Experimental

After 12% of PET dissolves in trifluoro acetic acid and dichloroethane co-solvent at 28℃ for 720 Min, carbon black master chips were added into the solution for 240 Min with stirring. A 0.01%. 0.005%, and 0.001% portion of C. I. Disperse yellow 79 were blended with the PET solutions to produce colored films. The PET solutions were coagulated in a coagulation bath. The coagulated films were soaked in distilled water for 60Min followed by drying at ambient temperature.

Table Ⅰ. Dissolution Conditions for High IV PET

IV(dL/g)	Solvent	Conc(%)	Disolution Temp (℃)	Disolution Time (min)
PET CARBON BLACK CHIP	Trifluoroacetic acid/dichloroethane (40:60;w:w)	12%	28	720

IV(dL/g)	Disperse dye Conc(%)	Disolution Temp (℃)	Disolution Time (min)
PET CARBON BLACK Colloid	0.001%	28	120
	0.005%		
	0.001%		

Table Ⅱ. Effect of Coagulation Composition on drawing behavior of PET Films at Coagulation

Coagulant	Draw ratio	Temp	Time
MeOH: H_2O=	10	-10℃	15min

3:1(V:V)			

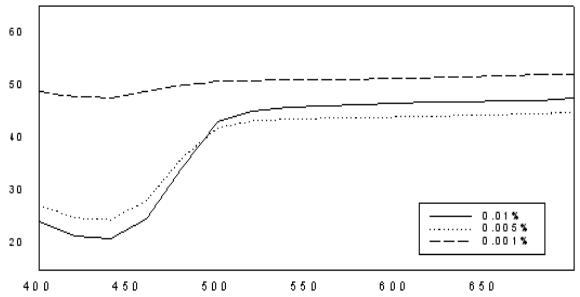

Fig1. Reflectance of PET films according to the dye concentrations

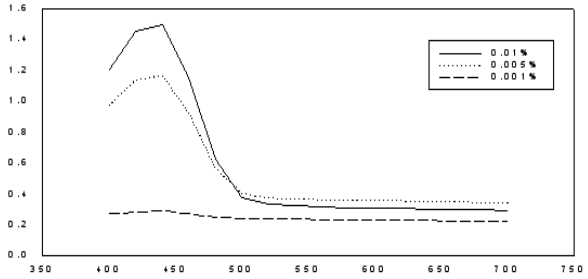

Fig2. K/S Values of PET films according to the dye concentrations

3. Results and discussion

1) With 0.005% of C. I. Disperse yellow 79, the color of PET film containing 1%

of CB was changed into different color with small reduction of properties.

2) After K/S measurement, the spectrum showed a highest point among among

400~450nm wavelength.

3) Reflexibility measurement showed that when dye density is getting thichker,

reflecting is getting smaller.

4. References

[1] GANG WU and JOHN A. CUCULO., Preparation of High Performance PET Fiber by Solution Spinning Technique Fiber and polymer science program, College of Textiles,North Carolina State University,Raleigh,North Carolina 27695-8301