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Olefin Polymer가 , 가

HDPE () LLDPE

HMW HDPE 「Down Gage Film

5 Polyolefin

가 , 가

Polymer 가

Olefin , System

가

Film Film Scrap Pelletization 가

Polyolefin , Degradation Stabilization

가 Polyolefin Stabilization

가

A. Polymer Degradation

B. Polyolefin Degradation

C. Degradation Chemical mechanism

D. Polyolefin 가

E. Polyolefin , 1 2

F. Mechanism

Degradation

Degradation , Polymer chain

Side Group Backbone . LLDPE Crosslinking 가 PP Chain

Scisson

Degradation 3

Melt degradation 가 Polymer

Thermal oxidation Polymer가 가 Photo

Degradation Polymer가

Polymer 가

Olefin Polymer Degradation 3가

A. Polyolefin Pelletizing

B.

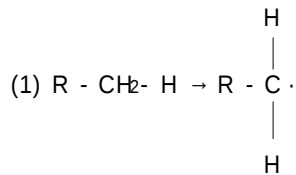
C. 가

- Blown film extrusion
- Cast film extrusion
- Blow molding
- Injection molding
- Rotational molding

- Melt spinning
- D. 가
- E. (Recycling)

Chemical Mechanism

Polyolefin Thermal degradation Free radical (1,2) (1)



Free radical Polymer . 가 Stress

(2) $\text{R} \cdot + \text{O}_2 \rightarrow \text{ROO} \cdot$

(3) $\text{ROO} \cdot + \text{R} \cdot \text{H} \rightarrow \text{ROOH} + \text{R} \cdot$

(2) (3) Propagation , (3) (4)

(5)

(4) $\text{ROOH} \rightarrow \text{RO} \cdot + \text{HO} \cdot$

(5) $2\text{ROOH} \rightarrow \text{RO} \cdot + \text{ROO} \cdot + \text{H}_2\text{O}$

(4),(5) Radical Propagation (6)

(6) $\text{RO} \cdot + \text{RH} \rightarrow \text{ROH} + \text{R} \cdot$

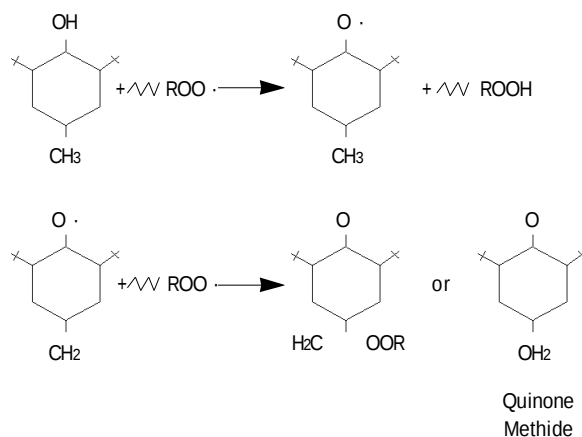
3 Initiation (1,4,5) 3 Propagation (2,3,6) , Degradation

, Species Polymer

Polymer Degradation

Stabilization

Polyolefin Stabilization



1

2

1 Alkoxy Peroxy

free radicals

Propagation

Aromatic Free

Resonance stabilization

7 Stabilization

2 Phosphite

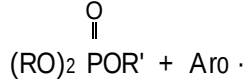
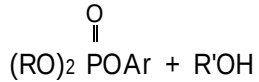
Free radical

Chelation (8)

(8) $\text{Mn} + \text{yP(OR)}_3 \rightarrow \text{M[P(OR)}_3\text{]}_y$

Phosphite Hydroperoxide

Alkoxy radical (10)



Phosphite

1

9

10

1

2

Phosphite

1

Quinones

Color

1 (Phenol type) 가

UV

Color

2

Phosphite 가

1

Graph 1~3

HMW HDPE

Graph 1 1

(AO-1) 670ppm 가

1

TBPP

가

1 Ultrinox-626

가

Graph 2

1

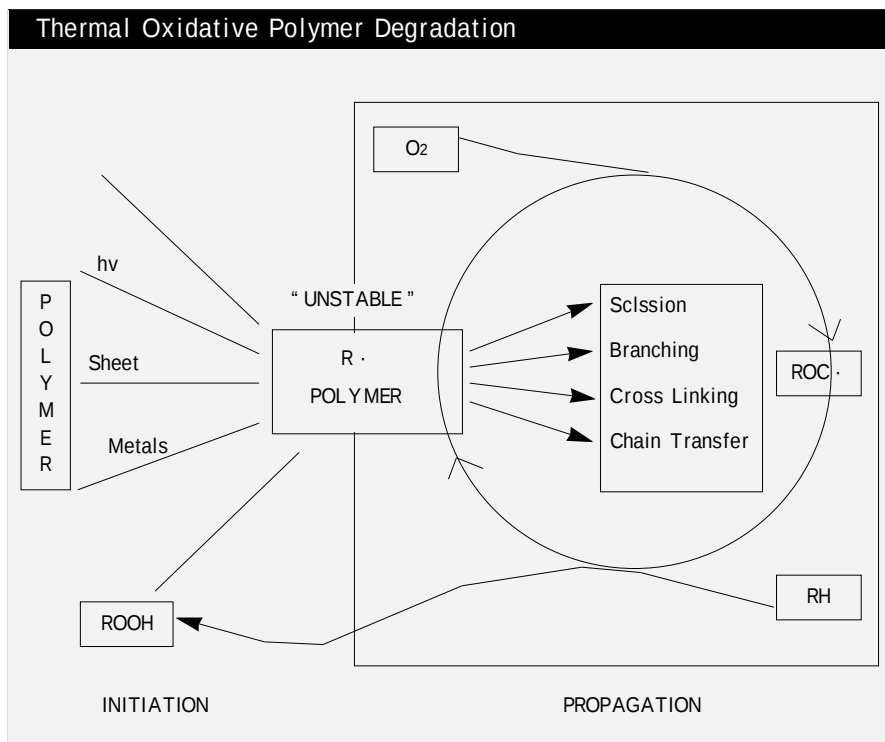
Color가

1 TBPP

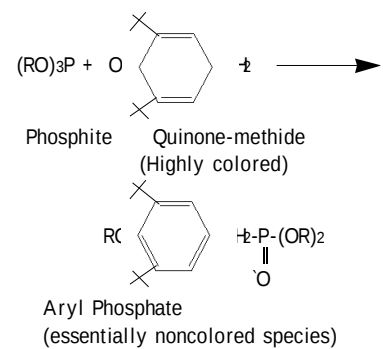
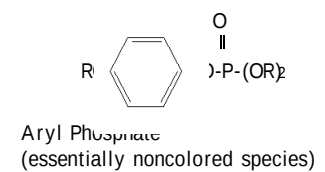
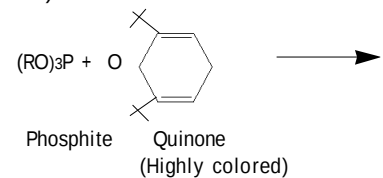
가

Color

가



11)



1, U-626 1
Graph 3

Color

Color

1

U-626

Combination

Degradation

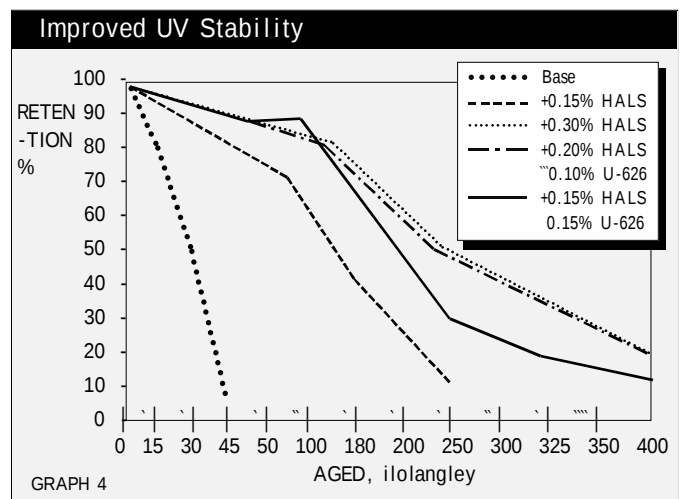
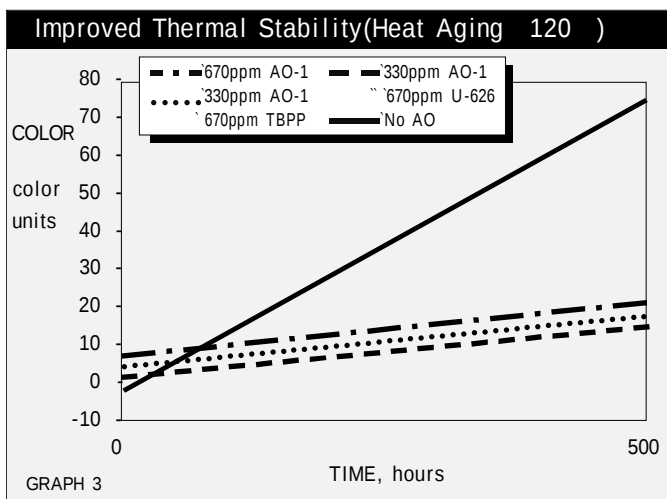
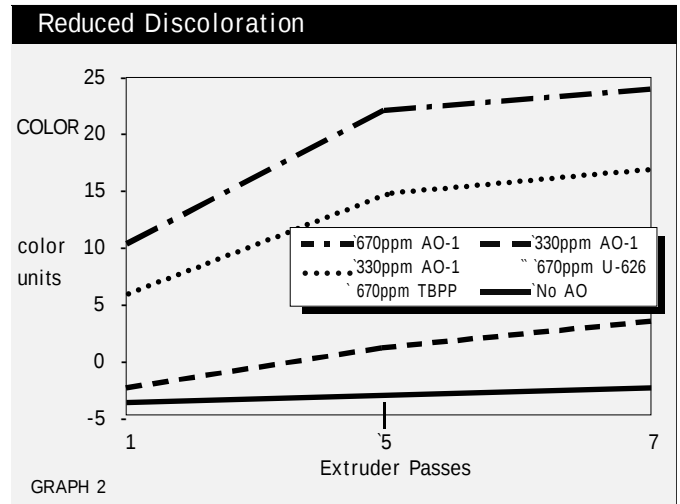
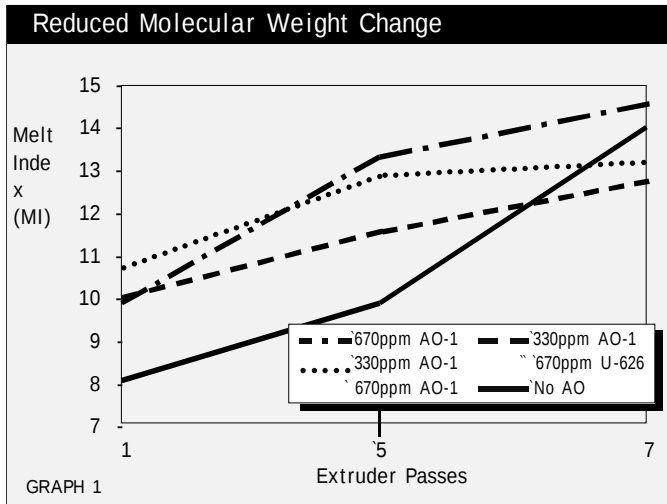
Graph 1~3

1

U-626

Combination

Polymer system



PP Fiber Grade

HALS U-626

가
Polyolefin

UV

Stabilization
Polyolefin

Graph 4
Factor
1 2

HALS 2

System Polymer 가

Polymer

Melt Flow, Color

가

P.11 ~ 19, 107 ~ 126.

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