

## Decoloring Effect of Viscose Rayon by Using Vapor Type Ozone Processing

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pick up ratio 60%, 50%, 40%, 30%,  
Pick up ratio가 40% 가  
가 가  
가 60

We studied on the decoloring effect of viscose rayon by vapor type ozone processing using ozone's strong oxidation. When ozone is generated, it becomes high concentration in vapor state, but in the insolving process with water, there are a lot of lose of ozone. As a result, a study using ozone in vapor-high concentration state is needed. So, in this paper, vapor type ozone processing is used unlike previous ozone treatment method - an aqueous solution method - to get a good effect from shortening the processing time. When vapor type ozone processing was directly treated to fabrics, high concentration ozone was generated then in a short time oxidized a dye existed in fabrics and finally decolored it. As vapor type ozone did not directly response to an organic dye, viscose rayon's decolorization was to be studied by changing pick up ratio(60%, 50%, 40%, 30%, 20%) using water as a medium. When pick up ratio of water was 40%, fabric's decolorization effect was improved because vapor ozone generated the most adjust oxalic acid to dissolve an organic dye. An experiment revealed that by lengthening the time of vapor type ozone processing, fabric's whiteness was improved but tensile strength and elongation were reduced. So 60 minutes was assumed as the most adjust time to minimize the reduction of fabric's tensile strength and elongation moreover to maximize the improvement of fabric's whiteness.

**Key words** : ozone, vapor type ozone processing, viscose rayon, decoloring effect





Fig. 1. Scheme of ozone generator.

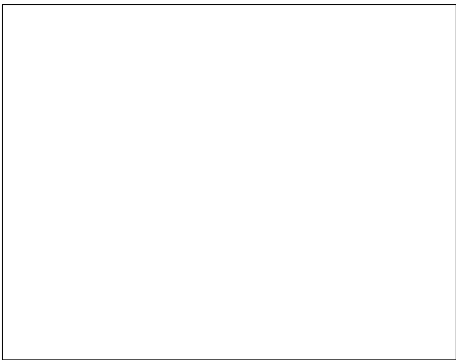
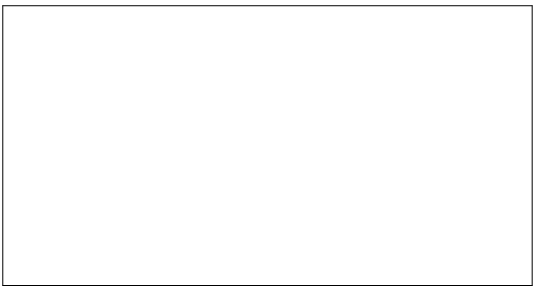


Fig. 2. Vapor/ozone contactor.

2) 가 6.8 Kv , 가 가 50 cc/min



4) , aspirator

padding mangle  
pick up 60%, 50%, 45%, 40%, 30%, 20%

3.

1) pick up  
Padding mangle (Model P-A1, Rapid Labortex Co., Ltd.) pick up

2)  
Color and color difference meter(Model TC -8600, Tokyo denshoku Co. Ltd ) , JISL1081 C (Hunter )

3) (Testmetric 220D , Karl Schroder KG ) , JIS L1020. 5.9

III.

1. Pick up ratio

Pick up ratio 60%, 50%, 45%, 40%, 30%, 20%

90 70

Fig. 3 pick up ratio 가 90

. Pick up ratio가 30% 가 가 40% 가 . Pick up ratio가 40% 가

Fig. 4 pick up ratio 가 70

. pick up ratio가 30% 가 30% 가 가

. Pick up ratio가 40% 90 가 가 70 pick up ratio가 40% 가

가

pick up ratio가  
 OH  
 가 가  
 ozone  
 가  
 가  
 pick up ratio가 40%  
 가 가

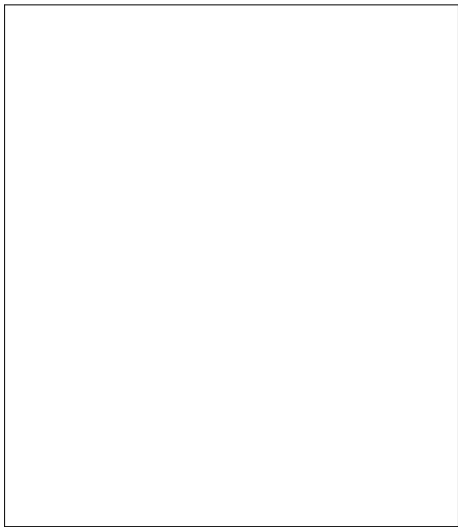


Fig. 3. The whiteness changes of viscose rayon by pick-up ratio (90 minutes)

2.

pick up ratio 40%, 45%, 50%, 60%  
 가 10

Fig. 5

. Pick up ratio가 60%  
 가 가  
 pick up ratio가 50% 60  
 가 가 60 가  
 가 . pick up ratio가

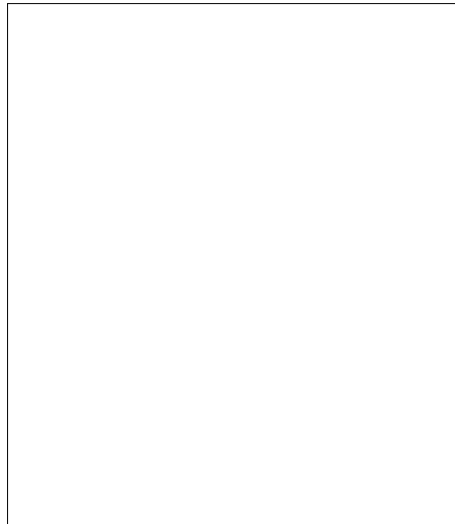


Fig. 4. The whiteness changes of viscose rayon by pick-up ratio (70 minutes)

45% 60 가  
 가 . Pick up ratio가 40% 60  
 가 가 가 60 100  
 가 pick  
 up ratio가 45% 100  
 pick up ratio가 40% 100

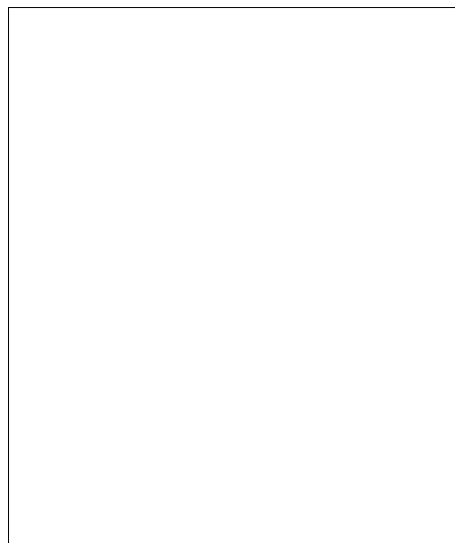


Fig. 5. The whiteness changes of viscose rayon by treated time

가  
pick up ratio가 40%  
ozone  
ozone  
radical  
가 가

3. Fig. 6 pick up ratio가 40%

30 , 50 , 70 , 90 , 100

30

30  
가  
가  
ozone  
가

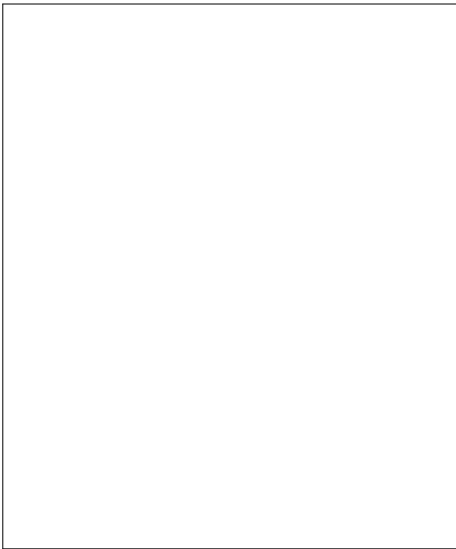


Fig. 6. The tensile strength changes of viscose rayon by treated time (pick-up ratio 40%)

가  
ozone  
cellulose  
glucose  
glucoside  
가  
가  
가  
가

4.

Fig. 7 pick up ratio가 40% ,  
30 , 50 , 70 , 90 , 100 가

30 가 가

가 30

가

가 가

30

가  
가  
가 가  
30  
glucoside

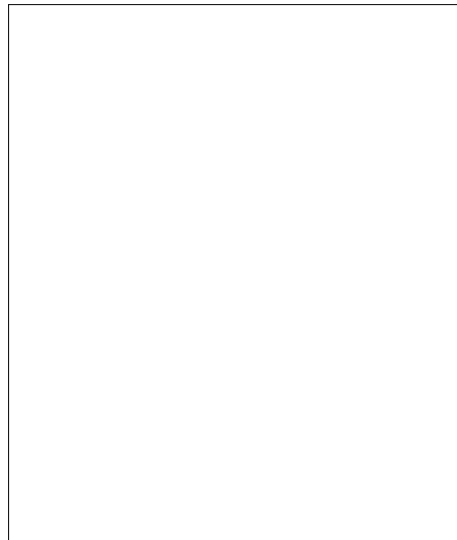


Fig. 7. The elongation changes of viscose rayon by treated time (pick up ratio 40%)

가  
가

5. SEM

30, 60, 100  
pick up ratio가 40%

Fig. 8~11

100

30 fibril 가  
가, 60  
fibril 가  
가  
가  
100  
가 가  
가  
60, 100  
가  
가  
가  
가  
60

cellulose  
가

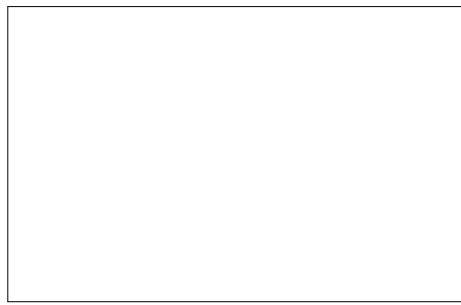


Fig. 9. The SEM photograph of viscose rayon fabric treated by vapor type ozone for 30 minutes (pick-up ratio : 40%)

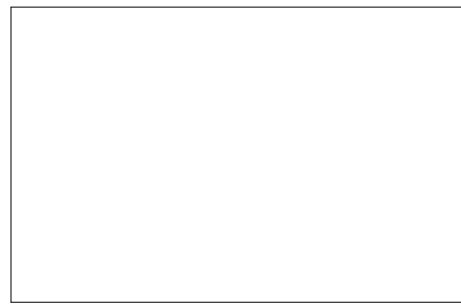


Fig. 10. The SEM photograph of viscose rayon fabric treated by vapor type ozone for 60 minutes (pick-up ratio : 40%)

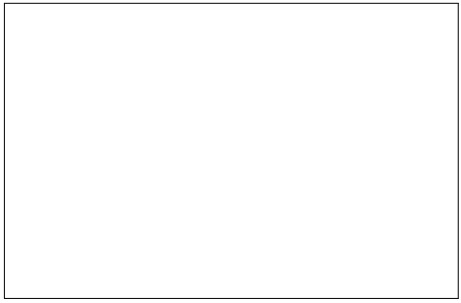


Fig. 8. The SEM photograph of untreated viscose rayon fabric



Fig. 11. The SEM photograph of viscose rayon fabric treated by vapor type ozone for 100 minutes (pick-up ratio 40%)

IV.

1. . 1992.  
 pick up ratio가 . 1996.  
 pick up ratio가 . 9(1):  
 가 9- 17.  
 가 pick up ratio 40% 가 . 1996.

2. . 94- G- 3: 1- 82.  
 radical . 1986. Studies on the ozone oxidation of  
 가 the aqueous dyes solutions.

3. cellulose . 1990.  
 glucose glucoside  
 , . 1987. . 清文閣. p. 158.  
 가 Katz, J. 1977. Ozone and chlorine dioxide tech-  
 60 nology for disinfection drinking water,  
 가 generation and usage of alternate disinfection.  
 Noyes Data Coporation. p. 108.  
 Kinman, R. N. 1972. Ozone in water and waste-  
 water treatment. *Ann Arber Science*, VII:  
 124- 130.  
 가 가 Rowlery, W. J., Otto E. D. 1980. Ozonation of  
 가 Cyanide with Emphasis on Gold Mill waste  
 pick up waters. *The canadian Journal of chemical  
 Eng.* 58. 646.  
 ratio 가 가 Tadashi Takada. 1989. Ozone detection by In<sub>2</sub>O<sub>3</sub>  
 가 thin film gus sensor. *Chemical Sensor Tech-  
 nology*. 2: 59- 70.  
 가 小林次郎. 1992. オゾンによる染色廢水處理. 加工  
 技術. 27(3).  
 松居正樹. 1993. 染色工業. 三秀書房. 41: 239- 240.  
 宗官 功. 1986. オゾン利用の新技术. p. 3- 5.  
 海賀信好. 1989. オゾン利用水處理技術. p. 27- 88.

1996. Ozone  
 . 8: 43- 55.