연마용 패드의 제조와 그의 마모특성

신정희, 주창환
충남대학교 공과대학 섬유공학과

Manufacture of Polishing Pads and Their Wear Characteristics

Jung-Hee Shin and Chang-Whan Joo
Department of Textile Engineering, Chungnam National University, Daejeon, Korea

Introduction

Polishing pads were widely used industry and domestic needs such as finishing processing, surface cleaning. Especially, it is necessary to require inherent luster of metal. The spot on metal surface polishing and lifetime were depended on properties of constituted fiber in polishing pads.

Raw material of polishing pads was used nylon. There have been no studies polishing phenomenon of fiber weight fraction and chemical property. Thus, polishing characteristics and diminution condition of spot generated by polishing have investigated in this study

Experimental

Polishing pads used experimental material was classified sample M and S. Sample M was constituted of Nylon 6, polyurethane(binder resin) and alumina particle. Sample S was constituted Nylon 6,6, phenol, acrylonitrile(binder resin) and silica particle. The basis weight of sample M and S was measured 1.5kg/m^2, 0.5kg/m^2 respectively. In order to observe basis constitution of sample M and S, we analyze basis character by FT-IR(MAGMA IR 560), DSC(Dupont).

Results & Discussion

Basis constitution

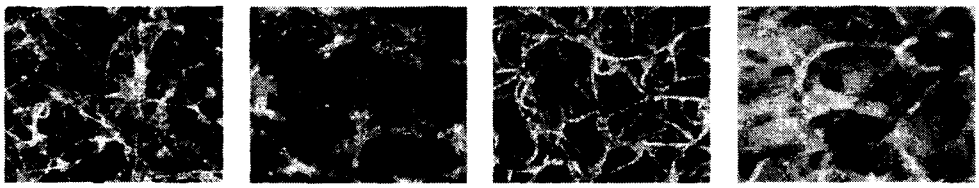
Table 1 shows analysis results of basis constitution.

Table 1. The basic analysis data of sample M and S

Type \ Sample	S	M
Fiber	nylon 6,6	nylon 6
TGA analysis(℃)(fiber)	280-430℃ (400-480℃)	240-520℃ (240-430℃)
DSC analysis(℃) melting point(fiber)	253℃(251℃)	249℃(247℃)
Fiber weight fraction(%)	61%	27%
Binder resin	phenol + acrylonitrile	Urethane

Morphological structure

Figure 1 shows morphological structure photographs of polishing pads by image analyzer. Sample M constituted low density consisted of most of binder and inorganic particle as shown in Figure 2(a, b), the inorganic particles and unrethane resin adhered to fiber was arranged on the multiplicity. On the other hand, It was observed that sample S(Figure 2(c, d)) constituted higher density than sample M had a small size particles by mixing fiber and binder.

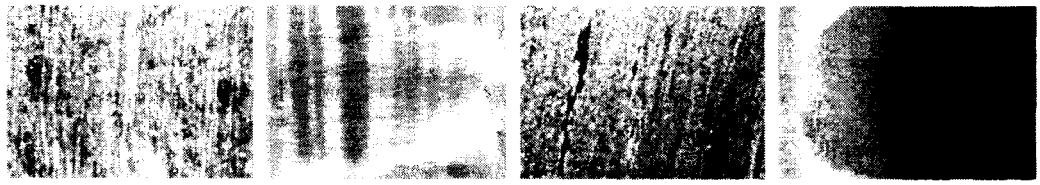


a b c d

Figure 1. Morphological structure photographs of polishing pads by image analyzer (a: M(50×), b: M(100×), c: S(50×), d: S sample(100×))

Polishing phenomenon

The polishing phenomenon of polishing pad was shown in Figure 2. In this case of sample, Figure 2(a) shows polishing traces on stainless steel plate surface, the fact means that inorganic particle cleaned the surface. On the other hand, during the sample S is polishing the stainless surface, it is found the gray spot of metal surface. Figure 2(d) shows that stack was overall on surface of stainless steel plate. Also, IR analysis result of the stack shows the C=O peak in about 1700cm^{-1}. So, friction heat generated by surface friction of residual fiber and nylon fiber is adhered to stainless steel plate surface.



a b c d

Figure 2. Surface photographs of stainless steel plate after the polishing(100X) (a: M (100×), b: M(1×), c: S(100×), d: S sample(1×))

Conclusion

In case of sample M, fiber weight fraction in specimen weight was 27 %, the fact means that fiber weight fraction is lower than sample S of fiber weight friction of 61%. And, sample M did not generate spot on the stainless steel surface by polishing, otherwise sample S did generate due to constitution fiber of polishing pads.

References

1. J. K. Lancaster, ASLE Transations, 18, 187-201(1974)
2. H. M. Hawthorne, Triboplogy and Mechanics Laboratory, 169-185(1991)
3. Y. T. Su, T. C. Hung and C. C. Horng, Wear, V(246), 117-129(2000)