Preparation of a polyhydroxy chrome retanning agent and its application in retanning process

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Introduction

Surfactant is a kind of substance that can change the interface state of the solution system. A new type of organosilicon surfactant (HBSi) with hyperbranched structure was prepared from hydroxyl-terminal hyperbranched polymer and epoxy-terminated silicone oil. The ability of silicone surfactants to reduce the surface tension of water was measured by automatic meter/interfacial tensiometer, the wettability of silicone surfactants was tested, the influence of silicone surfactants on the contact angle was tested, and the role of silicone surfactants in the process of leather retanning was tested.

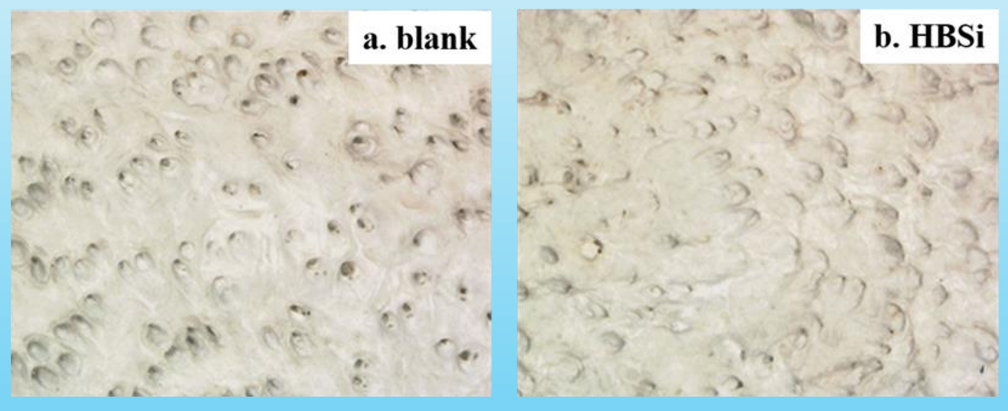


Fig. 1 Ultra depth of field electron microscopy of different crust leather

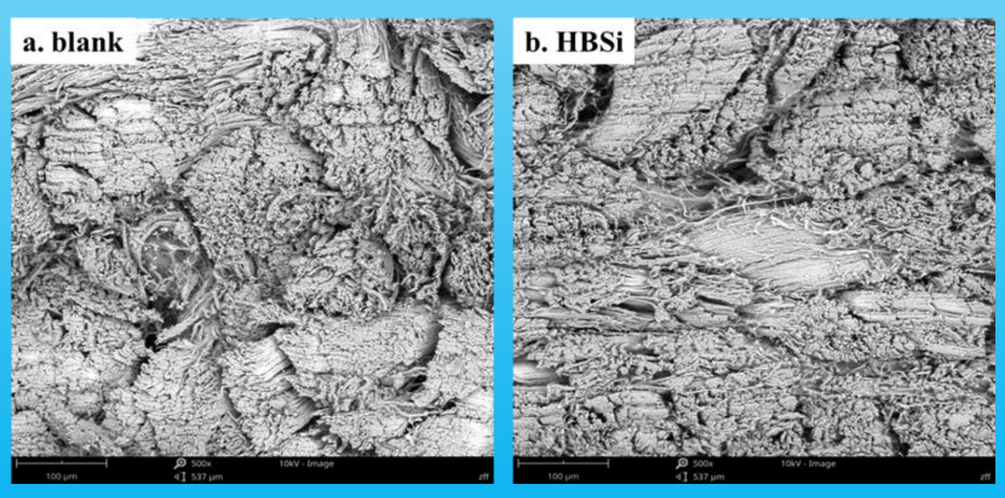


Fig.2 SEM analysis of different crust leather

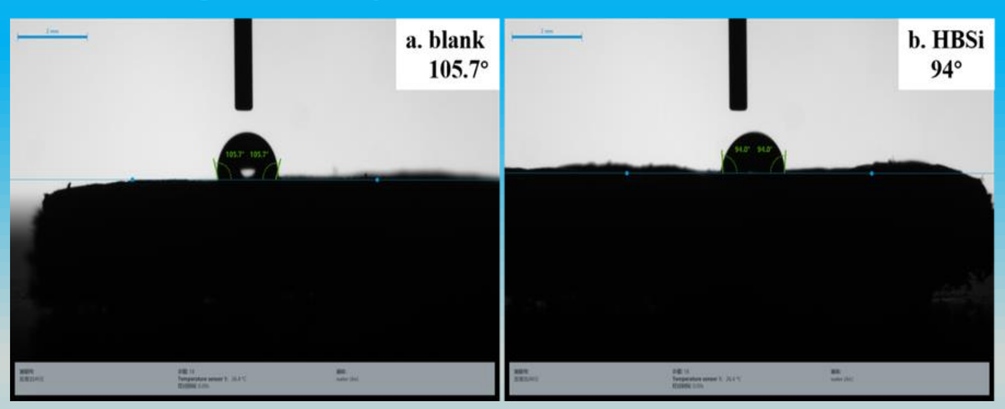


Fig.3 Water contact Angle measurement results

Experiment

Table.1 Retanning process

Reagent	dosage（%）	time（min）	pH
water	100%	10	
formic acid	0.5%	15	pH≈3.7
HBSi	x%	30	
chromium powder	2%	60	
sodium formate	1.5%	20	
sodium bicarbonate	0.3%	60	pH≈4.0

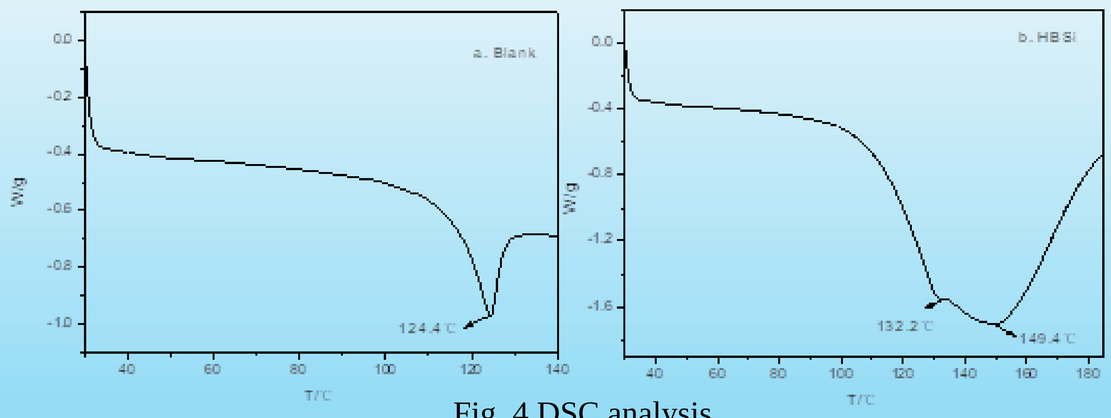
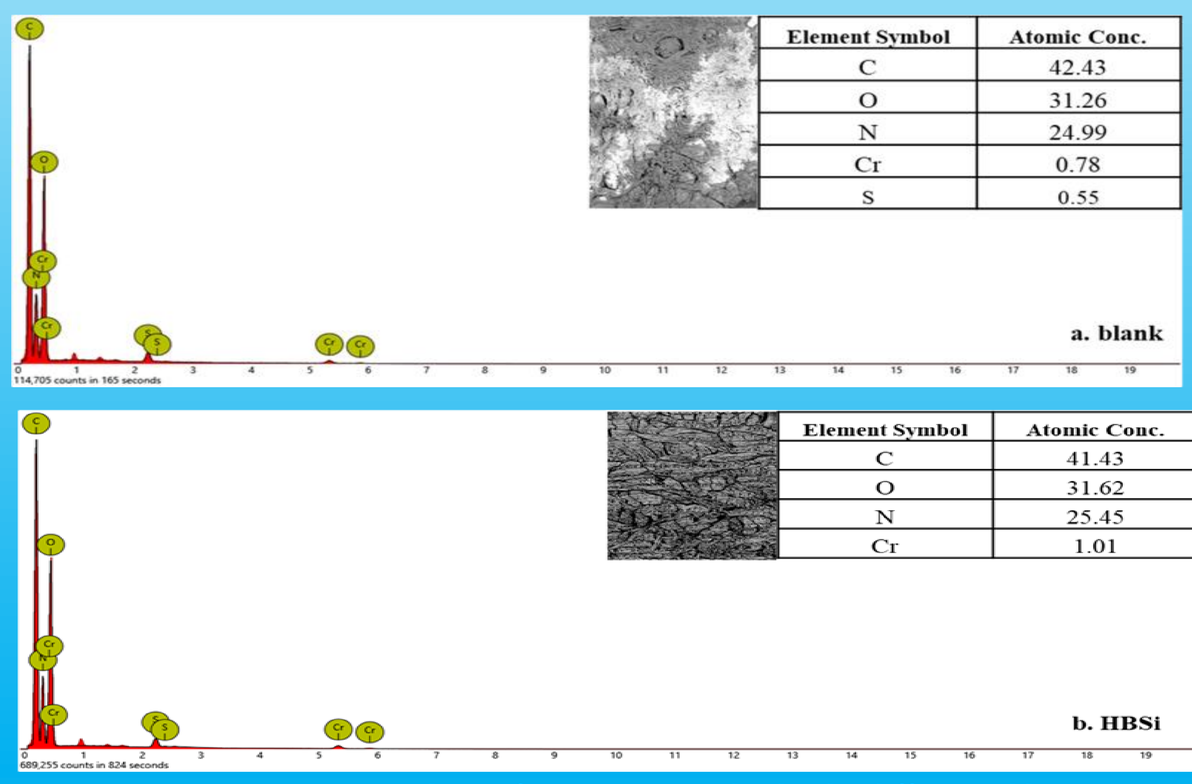


Fig. 4 DSC analysis



Element Symbol	Atomic Conc.
C	42.43
O	31.26
N	24.99
Cr	0.78
S	0.55

Element Symbol	Atomic Conc.
C	41.43
O	31.62
N	25.45
Cr	1.01

Fig. 5 EDS analysis of retanning crust leather by different additive

Table. 2 The Cr contents in retanning crust leather

	Cr（mg/L）		
Sample	1	2	Average value（mg/L）
HBSi	21.80	22.11	21.95
Blank	18.77	18.82	18.80

Conclusion

The results show that the silicone surfactant synthesized in this experiment can significantly reduce the surface tension of water to 24.96 mN.m-1, it also has good wettability and can reduce the water contact angle, it can improve the leather softness, air permeability and other physical properties in the process of leather retanning. The content of chromium in skin samples was determined by atomic absorption spectrometry after digesting by microwave. The average chromium content of the leather with HBSi was 21.95mg/L, while that without HBSi was 18.80mg/L. The addition of HBSi increases the chromium content of the leather and allows it to absorb more chromium during the retanning process.