Effect of hydrophobicity of post-tanning materials on microstructure and properties of crust leather

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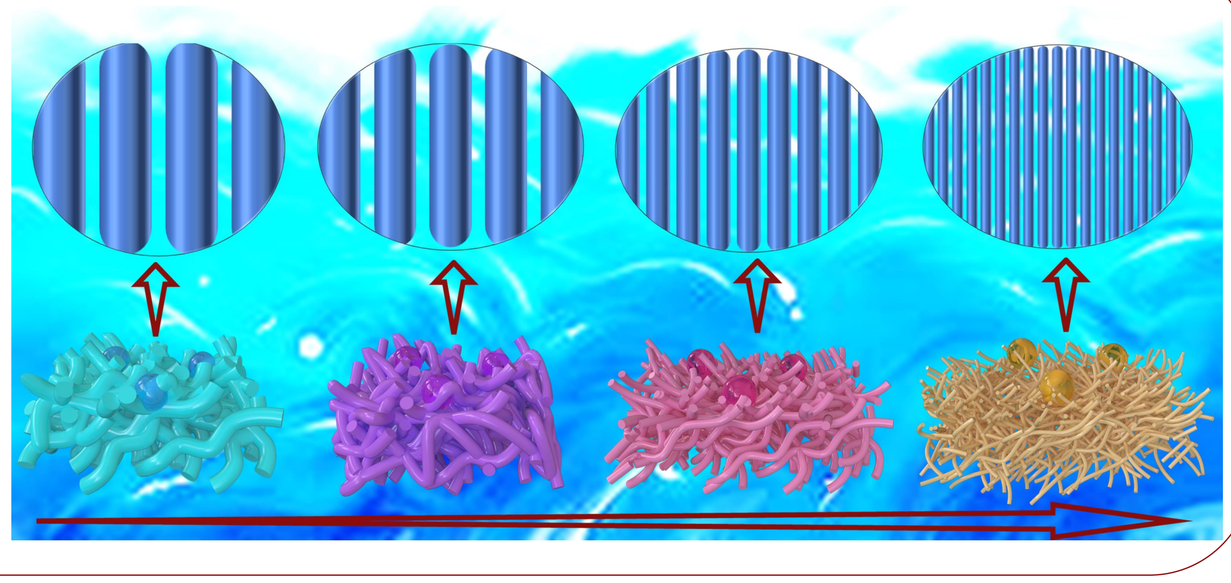
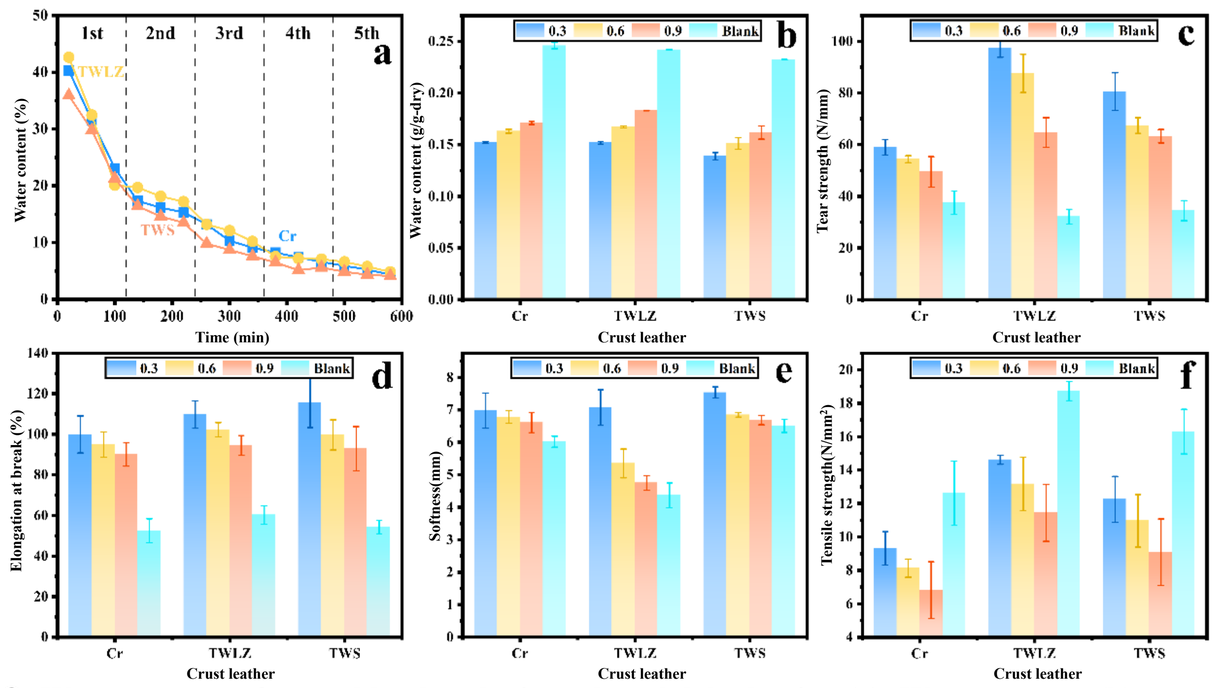
Introduction

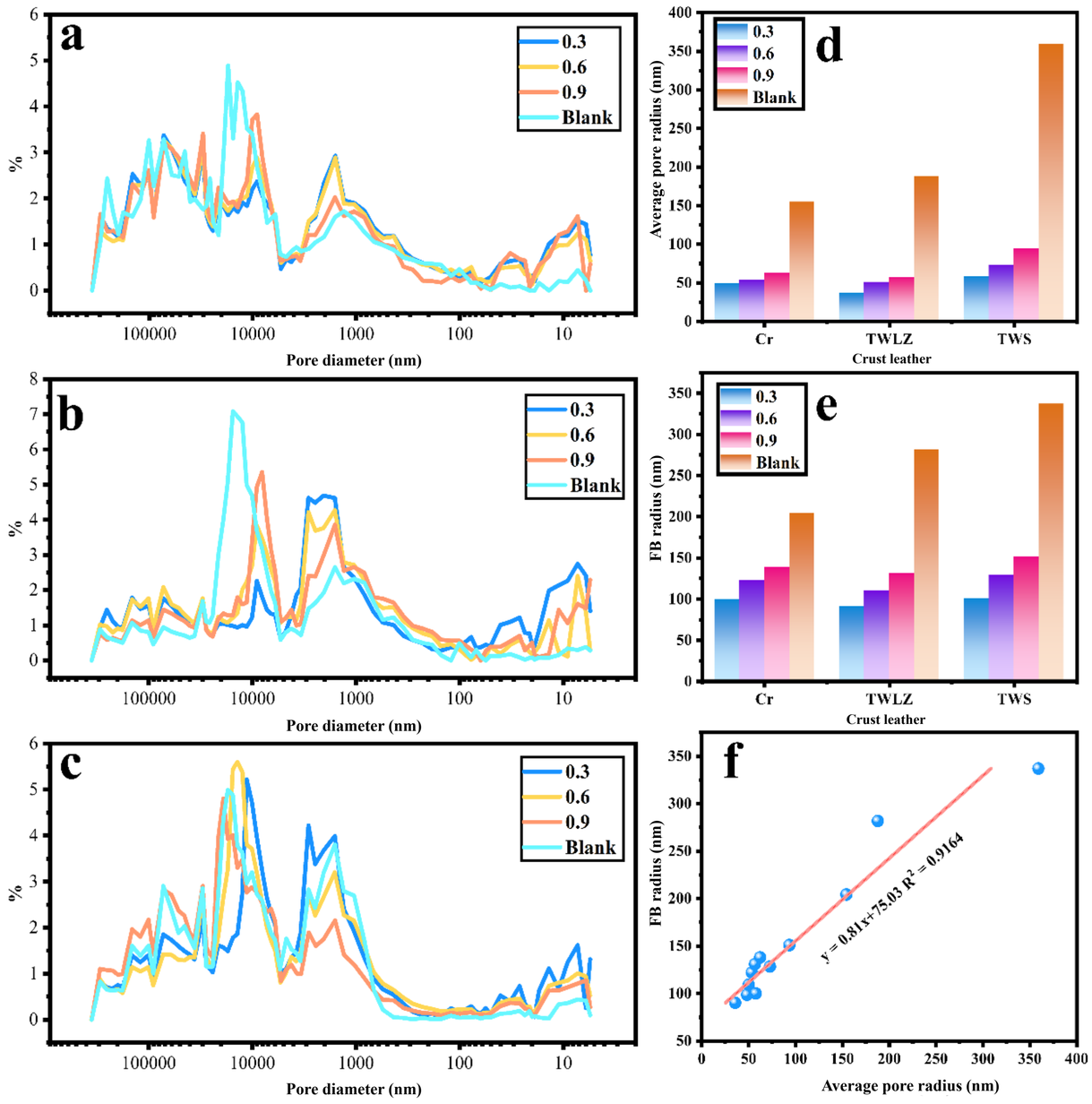
- The hydrophobic post-tanning material enhances the fiber dispersion and mechanics of the crust leather.
- The hydrophobic post-tanning material regulates the water types and fiber bundles radius of the crust leather.
- The fiber content/fiber bundle radius ((1 - P)/R) is proportional to the tear strength of the crust leather.



Results

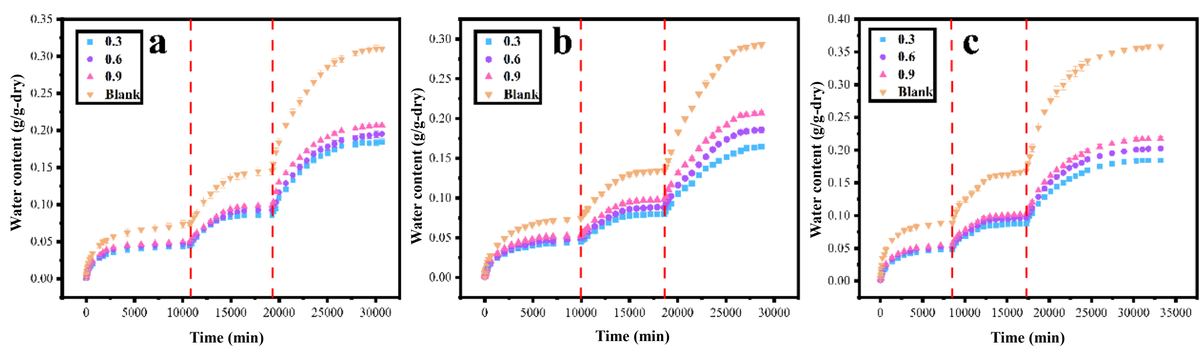


- Water content of tanned leather during ethanol dehydration (a); Water content (b), tear strength (c), elongation at break (d), softness (e), tensile strength (f) of crust leather treated with amino silicone oil.

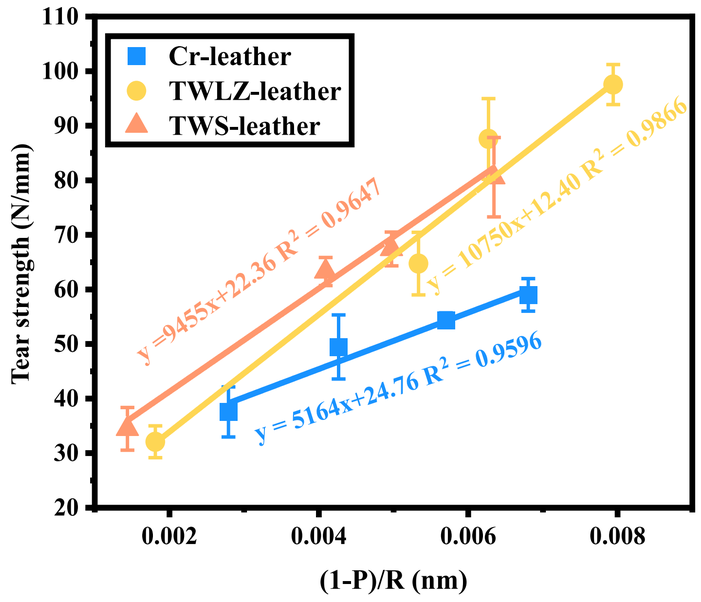


- MIP curves of crust leather treated with different amino silicone oils ((a) Cr-leather; (b) TWLZ-leather; (c) TWS-leather); Average pore radius of crust leather (d); Tanning FB radius (e); Fitting of average pore size and FB radius of crust leather (f).

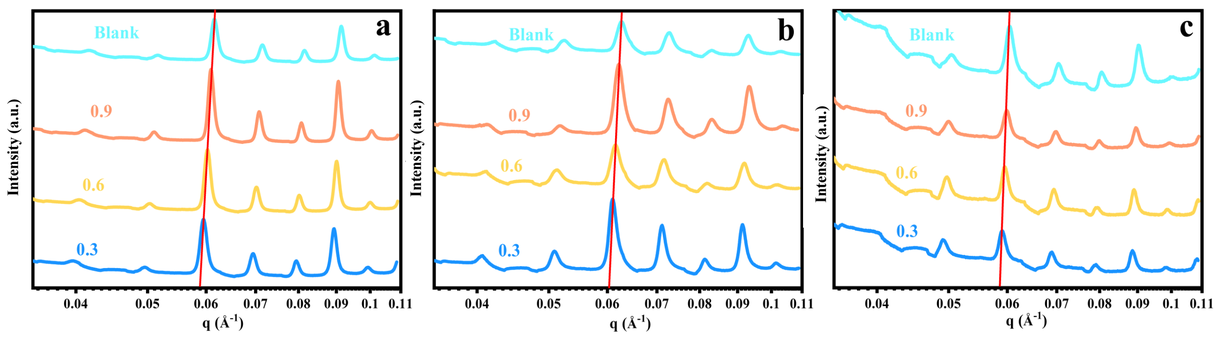
Results



- Rehydrated curves of 12 kinds of crust leather ((a) Cr-, (b) TWLZ-, (c) TWS-leather).



- Fitting of (1 − P)/R to the tear strength according to the crack-bridging model



- SAXS curves of (a) Cr-leather, (b) TWLZ-leather and (c)TWS-leather.

Conclusions

- Amino silicone oil can reduce the multi-layer water and side chain water content in the crust leather.
- Amino silicone oil can regulate the multi-layer pore structure in leather and improve the D-spacing of fibrils, and promote the formation of smaller pores and better dispersed fiber bundles in the crust leather.
- The linear correlation between tear strength and (1-P)/R validates FB as a bearing element for the mechanical properties of leather materials.

Acknowledgments

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