PDMS-E Grafted Gelatin Polymers for Coating Leather

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Abstract

Coating is central importance in the process of chemical treatment of leather. Gelatin, as a renewable and biodegradable material,[1-3] has been widely used in leather coating formulations. It has been a challenging task for polymer material scientists to chemically modify the molecular structure of gelatin in order to enhance the flexibility and hydrophobicity of the gelatin macromolecules and their processing capability. Inorganic-organic graft polymers with tunable chemical and physical properties were prepared from mono epoxy terminated PDMS macromonomer (Figure 1) and gelatain for improving the filming, flexibility and hydrophobicity of gelatin materials (Figure 2). SDS and SDBS were used to enhance the compatibility of two polymers phases for improving grafting reaction. The grafting density was measured using the Van Slyke and TNBS methods by measuring the conversion rate of free -NH_2 groups of gelatin. The results revealed that the microstructure transformation of PGG polymers was decided by relationship between the compatibility of two polymers in anionic surfactant aqueous solution and the chemical nature of their monomers. The waterproof ability and mechanical properties of coated leather change with the changing of microstructure of gelatin materials. The work is essential for revealing relationship between the microstructure of gelatin-modified materials and the properties of coating leather, leading to better control of the structure/performance relationship in coating leather.

Keywords: Gelatin; PDMS-E; Grafting density; Leather; Microstructure

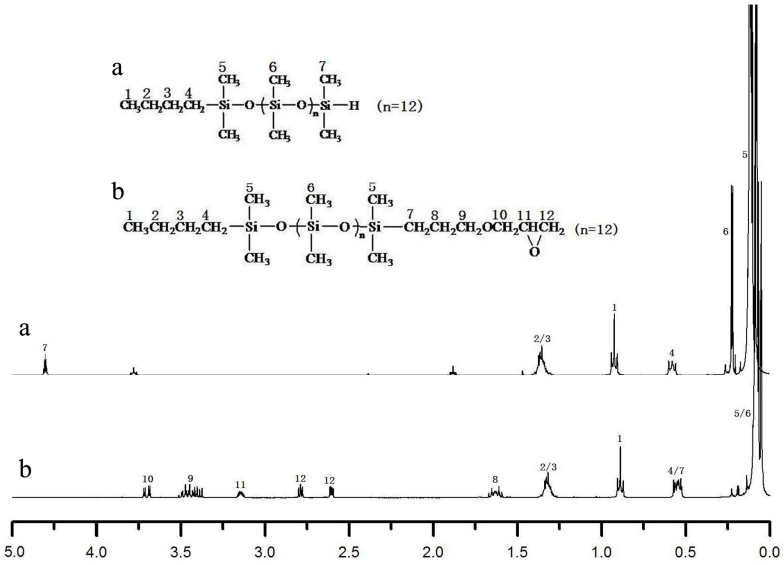

Figure 1. ^{1}H NMR spectra of the polymer PDMS-H, PDMS-E samples.

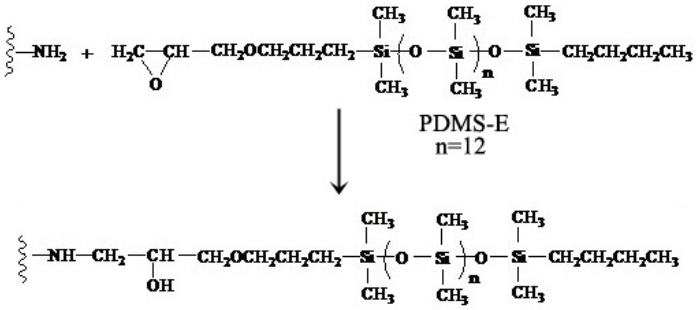

Figure 2. PGG Polymers Synthesis.

References

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