

Study on properties of modified starch/natural rubber composites

With the continuous improvement of people's awareness of environmental protection, the continuous shortage of oil resources in the world and the rising price of crude oil, it is of great significance to use limited resources to produce environmentally friendly materials that are harmless and pollution-free.

Natural polymers come from nature, such as natural rubber (NR), starch, cellulose and so on. They are environment-friendly materials. At the same time, natural polymers have many functional groups, so they have a wide range of application prospects.

In the chemical industry, NR, as a common natural polymer material, is widely used due to its excellent properties. However, the biological complexity of NR will have a certain impact on the performance of its rubber products. In order to reduce the impact, a simple and economical method is to add reinforcing agent or filler into NR.

from [Modified starch production line](#) In consideration of energy, cost, preparation technology and environment, the natural, cheap and pollution-free renewable natural resource -- starch is used as a reinforcing filler of natural rubber to replace the traditional reinforcing agent

(black carbon, white carbon, etc.) is very important.

Starch, however, contains a lot of hydroxyl, and because of the hydroxyl bonding, [Microwave drying machinery and equipment](#) The dispersion effect of starch in NR is poor, which affects the properties of rubber.

Therefore, we need to modify starch to overcome its limitations, in order to achieve the strengthening effect. In this paper, Si69 was selected to modify corn starch to prepare MCS/NR composite, and the effect of MCS dosage on mechanical properties of the composite was studied.

Rubber mixer, xk-160, wuxi chuangcheng rubber co., LTD. Plate vulcanizing machine, xlb-d350 x 350, Qingdao huatianxin industry and trade co., LTD. Electronic universal testing machine, UTM5000, shenzhen sansi zongheng technology co., LTD.

Shao type hardness tester, lx-a, laizhou tokugawa test instrument co., LTD. Rubber rebound instrument, wtb-0.5, jiangdu dao pure test machinery factory; Akron abrasion machine, mz-4061, jiangsu mingzhu experimental machinery co., LTD.

Silane coupling agent mixture solution was obtained by adding anhydrous ethanol and distilled water with a mass ratio of 9:1 in a clean beaker and adding a certain amount of Si69(3% of the mass of corn starch) after blending.

A certain amount of corn starch was put into a beaker, stirred with an electric mixer, and then

the prepared silane coupling agent mixture solution was added to the starch by dropping to complete the coupling effect.

Add time for 10 min, and then continue to stir for 30 min, after waiting for the mixing on the tray, and in the middle of 80 ° oven drying, for a quick MCS

Then, stearic acid, promoter DM, promoter M, ZnO and MCS were added. Finally, sulfur was added for mixing. The rubber was rolled and wrapped in triangular bags for many times to make the rubber and various auxiliaries mixed evenly. The curing conditions of 150 ° by 15 min.

Tensile properties, GB/ t528-2009, dumbbell type, tensile speed of 500mm /min; Tear performance, GB/ t529-2008, rectangular; Hardness, GB/T 531.1-2008; Resilience, GB/T 1681-2009; Akron abrasion, GB/T 1689-1998.

