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### Preparation and Analysis of Nano-Palygorskite and its Modified PF

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**Keywords** [Compound](#), [Nano-Palygorskite](#), [Preparation](#)

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## Preparation and Analysis of Nano-Palygorskite and Its Modified PF

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**Keywords:** Nano-Palygorskite, Compound, Preparation

**Abstract.** This paper introduce a way to prepare Guizhou palygorskite mineral nanoparticles by dry-wet ball milling and modified its surface, with adding it in pre-polymer and dispersing with supersonic disperser. Then it introduced preparing the tung oil phenolic-formaldehyde (TPF)/ nano-palygorskite composite resin by situ. The TENSOR27 IR and JEM-2000FX II test shown that the nano-palygorskite particles embedded in the polymer and they were more evenly dispersed. By NETZSCHSTA409 thermal analyzer for TG analysis, the elevated of compound PF has been enhanced.

### Introduction

PF as the base material of polymer is used in multi-fields, specific used in the friction material of non-metallic or semi-metal. Machines used for Motors or Translation need higher speed and more bearing, so the industry is asking for a better friction material. For ordinary friction material, PF occupied 10%~25% or more. It is a key point for friction material on heatproof, hard-wearing, intensity and so on. To improve performance of friction material, people had done a lot of works in improving the heatproof or intensity of PF with compound or modified [1]. It contains used chemical modified or adding the inorganic nanoparticles.

Now inorganic silicate nanoparticles minerals were widely used in polymer modification and also got many useful results. Japanese scholars, for instance, got the Nylon-6/Montmorillonite nanoparticles composites by intercalation method [2]; CAS Chemistry got the high strength, light weight and thermal stability, also it got the enhanced Polymer-Layered Silicate Nanocomposites in 2D. Nano-mineral silicate / polymer composite materials research is a hot spot in material studies. Guizhou palygorskite mineral is Al-Mg and hydroxyl silicate mine. Its molecular formula is:  $Mg_5(Si_4O_{10})(OH)_2(H_2O)_2$ . It is the natural nano-scale silicate nanometer mineral of crystal rods in 2D [3]. It is the ideal mineral resources for preparing the polymer nanocomposites [3]. How to prepare the palygorskite nanoparticles and how to be decentralized in polymer system is also one of the most important problems in nanocomposite materials. In this paper, prepared palygorskite nano-scale particles by dry-wet ball milling got better results than dry [4] or wet ball milling. And we used situ method prepared synthesis TPF/ nano-palygorskite composite resin, better dispersion of nanoparticles, improved access to high-temperature heat resistance, friction material is expected to improved performance.

### Experiment

#### Preparation of the Main Processing Plant and Test Equipments.

(1) Plants and Equipments: SF120 kibbler that is made in China is used for smashing palygorskite. Centrifuge is used for purifying mineral. QM-4H ball mill that is made in China is used for preparation nanoparticles. In order to dispersing nanoparticles, we used SW-101Z ultrasonic cleaning which is also made in China. And by heating, cooling tubes, three flasks formed the back streaming reaction system of polymer. Also the apparatuses contain a ZXZ-2 vacuum pump system which is made in China.

(2) Testing equipments: JEM II-2000 TEM (made in Japan); D/MAX-2200 X - ray (made in

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