

Study on the surface modification of kaolin plasma technology

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Abstract. Using plasma technology for pre-processing of kaolin by sedimentation settling tests to verify the performance of kaolin change. Then silane coupling agent and ethanol pretreatment plasma technology kaolin modified by sedimentation experiments to study its effect modification. The results showed that: 1) leads to oxygen plasma technology for kaolin processing, you can change the settling characteristics of kaolin. 2) After absolute ethanol and silane coupling agent-modified kaolin, dispersion stability in a liquid paraffin to obtain some increase. 3) leads to oxygen plasma processing technology, and then dried over anhydrous ethanol and a silane coupling agent-modified kaolin, dispersion stability in liquid paraffin would once again be improved; and when processing 15min, modified kaolin dispersion stability in liquid paraffin best.

1 INTRODUCTION

Kaolin is an important industrial mineral raw material, rich in resources and has the advantages of plasticity, suspension property, fire resistance, chemical stability, ion adsorption and surface electrical properties, has become an indispensable mineral materials, paper, rubber, ceramics, refractory materials and chemical industry. But at present, the application of kaolin is not very extensive. In order to improve the application of kaolin, we can change the surface properties, the fatty acid salt, the silane coupling agent, surface modification of kaolin, physical and chemical properties can improve the surface, to improve its dispersion stability and reactivity.

2 THE CRUDE ORE PROPERTIES

According to research has done on the crude ore, the analytic results of multielement are shown in Table 1.

Table 1. The multielement analysis results of raw ore.

Element	Content/[%]
SiO ₂	44.61
Al ₂ O ₃	38.02
Fe ₂ O ₃	0.23
TiO ₂	1.15
Na ₂ O	0.26
CaO	0.12
K ₂ O	0.08
MgO	0.05

3 THE TEST PROCESS

The test required kaolin into electric heated blast oven, the temperature adjusted to 100°C, heated for 6 hours after the removal, to obtain a dry kaolin. Oxygen is introduced into the plasma etching

temperature ashing apparatus, will be inside the gas removed, in order to achieve the test requirements. During the drying of the kaolin weigh 5g, the standard sample 1. Then the 5 times the same quality kaolin, are recorded as sample 2, sample 3, sample 4, sample 5, sample 6. The 2 samples into the plasma etching temperature ashing apparatus, oxygen is introduced into the instrument, plasma processing technology makes the sample in oxygen atmosphere, out of 2 samples were obtained after 5min. The rest of the samples were 10min, 15min, 20min, 30min were 3,4,5, 6.

30ml of anhydrous ethanol and 2.5g of a kaolin sample, mixed in a beaker, then add 0.5g of a silane coupling agent, homogeneously mixed by stirring 20min, then allowed to dry in an oven kaolin obtained modified sample 1, and then the samples were taken other kaolin repeat the above steps to obtain a sample of the modified 2,3,4,5,6.

The surface modification, the main is to change the polarity of the surface of kaolin, which changed from hydrophilic to hydrophobic, enhance its compatibility with non-polar polymers. In view of this, the author adopts the dispersion stability of liquid paraffin in the non polarity of initial criterion, as the modification effect. The 0.6g modified samples 1, added to liquid paraffin 20ml, mixing 10min with magnetic stirrer, the sample is evenly dispersed, and finally into the cylinder, the settlement observation and record the height. Then the other modified samples were also 0.6g, dissolved in liquid paraffin, repeat the above steps, observe and record the height; and then remove the 0.6g kaolin raw samples, repeat the above steps, to compare with other modified samples. Under the same experimental conditions, the volume of sediment is greater, that dispersion of modified kaolin in liquid paraffin and the stability is better. The modification effect is better; otherwise the worse. The same cylinder, sediment height reflects the volume of sediment can be high, so we just need to compare the sediment.

4 EXPERIMENTAL RESULTS

After the treatment of settlement processing diagram, as shown in the following Figure 1.

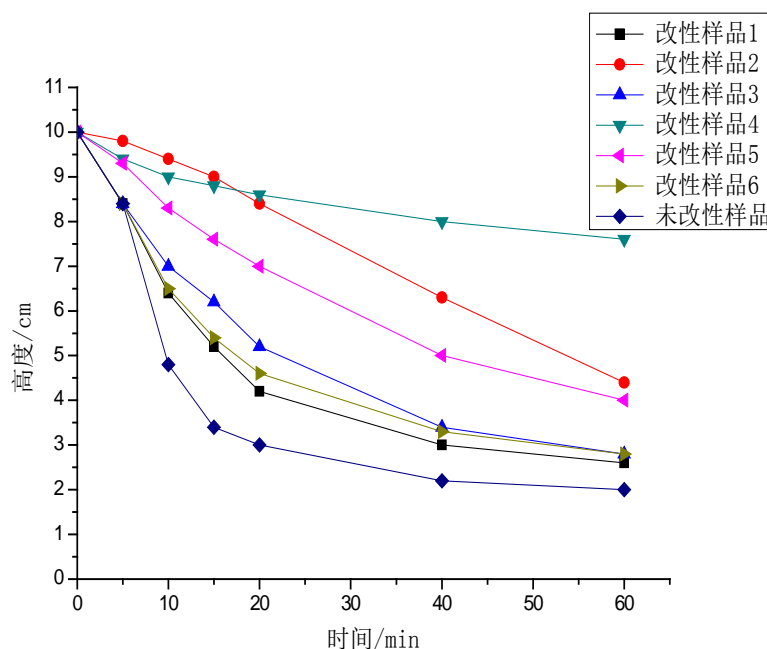


Figure 1. General settlement process diagram

It can be seen from the chart: The modified kaolin, dispersion stability in liquid paraffin was improved; oxygen plasma treatment, and then the modified kaolin, dispersion stability in liquid paraffin will be further improved; with the increase of plasma treatment time, the dispersion stability of modified kaolin in liquid paraffin also gradually increase, when processing the 15min,

the dispersion stability of modified kaolin in liquid paraffin, and later with the increase of processing time, the liquid paraffin dispersion stability decreased gradually.

5. CONCLUSION

- 1) Leads to oxygen plasma technology for kaolin processing, we can change the settling characteristics of kaolin.
- 2) After ethanol and silane coupling agent modified kaolin in liquid paraffin, the dispersion stability was improved.
- 3) Leads to oxygen plasma processing technology, and then dried over anhydrous ethanol and a silane coupling agent-modified kaolin, dispersion stability in liquid paraffin would once again be improved; and when processing 15min, modified kaolin in the liquid paraffin dispersion stability is best.

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