The Preparation and Research of Small Molecular Group Water

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Abstract. The qualities of water are closely related with human health. Small molecular group water which contains 5-6 water molecules plays an important role to human body health. This paper reviewed the pure water was treated by the micro-nano powder of the Guhai rock to prepare a kind of small molecular group water which was weak alkaline, small molecular clusters, and rich in trace elements and the study of the small molecular group water which had been prepared.

Introduction

The Guhai rock was a kind of natural l sedimentary rock. And it was non-toxic, tasteless, no radiation. It has the function of radiating far-infrared ray at 20 ℃ ambient temperature. The wavelength ranged from 8 μm to 15 μm. Because of far infrared ray and cell and molecular vibration frequency was close to in the human body, after the "light of life" into the body, it will cause the resonance between the body cells of atoms and molecules. Far infrared ray can improve blood circulation and improve the body's immune function, etc. In addition, Guhai rock released anion which was of great benefit to human health [1]. It had a good adsorption capacity and purification. The Guhai rock contained germanium, calcium, magnesium, potassium and other trace elements, so it can replenish minerals needed for daily.

Odrinary water was generally a large molecular mass of water. At present, we used some methods change the size of the water group .The commonly used methods contain magnetic field, applied electric field, laser radiation and direct heating and other methods[2]. Studies had shown that[3], the smaller the water molecule clusters, the higher the water molecular potential energy of hydrogen bond, and the greater momentum of the water molecule clusters. The small molecular group water is mainly composed of small molecule clusters. Its physicochemical properties were increased. The physicochemical properties contained dissolving capacity, penetration, metabolic capacity and the diffusion ability. The small molecular group water can help digestion and balance body temperature. It can improve high blood pressure, diabetes and other chronic diseases. It can also enhance human immunity, etc.

Experimental Procedure

The micro-nano powder of the Guhai rock was prepared by the micro/nano technology. After crushed, the micro-nano powder was put into the 1000ml of pure

water to fully stir. Then used the ultrasonic to shock .After being static, the mixture was carried out coarse filtration, fine filtration, more than the rate in turn.

We used x-ray diffraction analysis the composition of the Guhai rock. Scanning electron microscopic (SEM) was observed the surface topography of the Guhai rock. The structure of water molecule clusters was characterized by using high resolution nuclear magneticresonance spectrometer. The inductively coupled plasma atomic emission spectrometer was used to analyze the trace elements in the sample. The pH value, redox potential and ^{17}O-nuclear magnetic resonance of the small molecular group water were respectively tested by using pH meter, oxidation-reduction potentiometer, and high resolution nuclear magnetic resonance spectrometer.

Results and Discussion

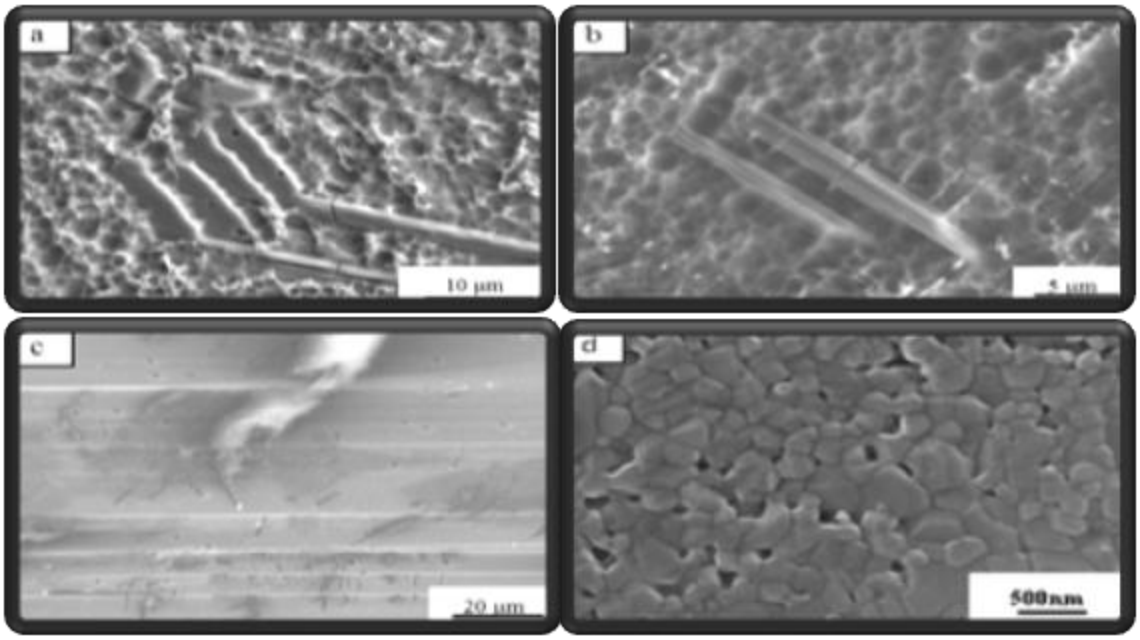

Figure 1. SEM images of the Guhai rock

As shown in Figure 2A and Figure 2B ,two typical microstructures existed in the Guhai rock.One was acerose structure and the other was lamellae structure. These two typical structures made it capable of producing a weak current. Such an electrode chemical reaction can make water electrolysis to produce anion. As shown in Figure 2C and 2D,nano-sized pipeline which inner face was smooth was existed on the Guhai rock. The Guhai rock has good absorption capacity.

Table 1.pH value

Material name	Pure water	Natural river water	Small molecular group water
pH value	6.0	6.7	7.5

As shown in Table 1,the pH value of pure water and the small molecular group water was 6.0 and 7.5,respectively. It shows that the Guhai rock has absorption ability.

Table 2. ORP

Material name	Pure water	Natural river water	Small molecular group water
ORP(mV)	330	245	125

As shown in Table 2, the redox potential of pure water became lower after it processed by Guhai rock .It can also show that the Guhai rock has good absorption.

Table 3.The elements concentration

Elements	Mo	Co	Cu	Mn	Fe	Zn	Mg	Ca	K	Na	Al
C(ppm)	0.022	0.035	0.007	0.006	0.009	0.062	2.926	12.083	0.960	4.410	0.22

As shown in Figure 3,there are many trace elements which required in the human's body were contained in the small molecular group water. Iron, copper, zinc, manganese, molybdenum and cobalt are essential trace elements in the human body[4]. This shows that the small molecular group water can replenish minerals needed for daily.

Table 4 The result of 17O-NMR test

Time(year)	2000	2010	2011	2012	2013	2014	2015	2016
50% line-width(Hz)	82	62	54	52.5	52.5	57	51	52

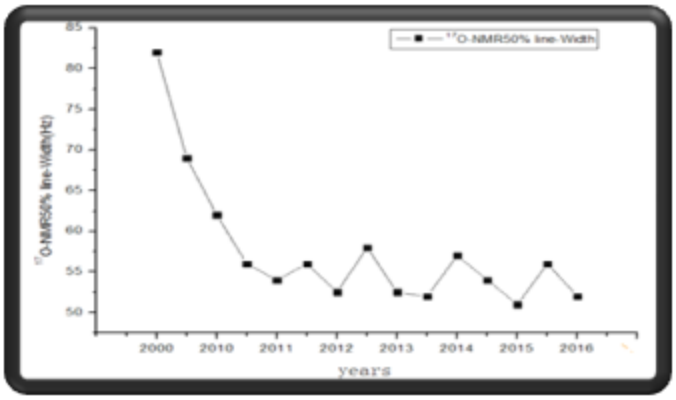

Figure 2.The result of17O-NMR test

Table 4 and Figure 4 showed the 50% line width of ^{17}O-NMR spectrogram of the small molecular group water which was tested in different time. The 50% line width showed downtrend along with time, and finally it trend toward a stable value less than 60Hz.This phenomenon shows that the small molecular group water contained 5~6 water molecules. The spectral line width of ^{17}O-NMR can be used to reflect the average relative size of the structure of the liquid water clusters, the wider the line , the greater the clusters; the narrower the line, the smaller clusters[5].

Conclusions

In this paper, weused the Guhai rock and pure water to prepare small molecular group water. Through a series study on small molecular group water, conclusions are obtained as follows:

(1) The small molecular group water was successfully prepared and the structure of small water clusters was stable.
(2) The small molecular group water presented weak alkaline, and the pH value was 7.5.
(3) The small molecular group water contained many major and trace elements needed by the human body, and it is suitable for human drinking.
(4) The redox potentialof pure water became lower, and the small molecular group water had antioxidant function.

References

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