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Research Article

A New Type of Nanomaterial Traditional Martial Arts Training Body Protector with Buffering Effect

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With the development of people's living standards, the growing prosperity of the motherland, the traditional culture has been paid more and more attention, and traditional martial arts as a part of traditional culture is not only good for viewing but also strengthens the body, so it has been loved by many people. Traditional martial arts training is a high-collision, injury-prone sport, and making a good buffer protector can improve the safety of martial arts trainers and reduce the concept or degree of injury to athletes. Nanomaterials are materials produced by nanotechnology that are extremely small in one-dimensional, two-dimensional, or even three-dimensional directions, and are several nanometers long in at least one direction. The purpose of this paper is to study a new type of nanomaterial with buffering effect, so as to understand the actual protective effect of body protectors made of this material on martial arts trainers. In this paper, a net-like plant fiber nanobuffer material is proposed, and the relevant mechanical experimental tests are carried out on the material. According to static tensile experiments, the mesh nanofiber material can withstand a pressure of 1.2 million Pa under 90% strain, while ordinary fiber materials can only withstand a pressure of 700 thousand Pa under 80% strain. And the resilience of the mesh nanofiber material reaches 1.8 mm/s, while the maximum of ordinary fiber material is only 0.6 mm/s, which means that the protective gear made of mesh nanofiber material can significantly improve the stress bearing capacity of the protective gear and improve the rebound effect.

1. Introduction

With the development of science, technology, and industry, nanomaterials have become important materials used in many fields, and the protective ability of nanomaterials has become a concern in all kinds of intense sports or training venues. Especially in the training of martial arts, trainers will be subjected to various shocks, and the degree of shock is also different. These shocks will lead to changes in the trainer's athletic state, and serious injuries will lead to fractures of athletes. In order to minimize the injury of personnel during the training process, it is necessary to select appropriate buffer nanomaterials as body protectors to achieve the effect of buffering and antiseismic, so as to protect the trainers and avoid serious injuries to the trainers during the training process. Generally, an appropriate buffer pad is added to the protective gear to absorb the impact energy of the outside world on the product, so as to achieve the buffer effect and protect the trainer. The foam material used to reduce shock and vibration during martial arts training is the buffer. The whole product and package are called protective gear, and the buffer material in the buffer system plays a decisive role. The function of martial arts is not only limited to fighting but also has dance, art, technology, maintenance, health, governance, and other categories. However, due to historical reasons and social development factors, traditional martial arts have developed to today, and its functions have included fitness, health preservation, competition, and fighting. The most common ones are performance and display [1].

In martial arts training, the buffer material plays a very important role in protecting the human body and can greatly avoid personal injury. Therefore, it is very necessary to conduct in-depth research on buffer materials. For the research on protective gear of nanomaterials, some scholars have published relevant academic articles on it. Among them, Jung et al. identified potential nucleophiles that could be incorporated into PIMs by quantitatively comparing the reactivity of multiple small-molecule nucleophile scaffolds as organophosphate scavengers. Jung et al. provided new insights into PIM as a reactive material for CWA decontamination and its potential use in protective gear [2]. Heinze and Carastan investigated the effects of fumed silica content, ultrasonic energy used during silica particle dispersion, and humidity during storage to analyze the performance changes of STF. In stable samples, water uptake results in a substantial loss of maximum viscosity. Humidity on the sample reduces the overall viscosity but does not prevent the sample from turning into a gel if the parameters used cause the STF to become unstable. Shearing STF reduces its maximum viscosity, more so in higher viscosity samples [3]. Cerium oxide nanoparticles (CeNPs) have been shown to have antioxidant capacity. However, their efficiency in scavenging reactive oxygen species (ROS) and their underlying mechanisms remain unclear. Filippi et al.'s study found that ceria nanoparticles (CeNPs) and nanorods (CeNRs) exhibited stronger scavenging activity than OH generation in phosphate-buffered saline (PBS) and alternative lung fluid (SLF). These insights are important for understanding the redox activity of cerium nanomaterials and providing clues to the role of CeNPs in biological and environmental processes [4]. Rzayev highlighted the ability of molecular bottle brushes as highly tunable building blocks for the creation of nanostructured materials through molecular templating, solution polymerization, and melt self-assembly. Rzayev also highlighted recent achievements in the synthesis of discrete nano-objects, micellar structures, and periodic nanomaterials from bottlebrush copolymers and briefly discussed future opportunities in this field of polymer science [5]. Zheng et al. first described the mode of action of silver nanoparticles (Ag NPs) in disrupting bacterial cell outer membranes and their intracellular components, then allowing them to exhibit broad-spectrum antibacterial effects. Zheng et al. next invented an emerging high-efficiency antibacterial agent, ultrasmall silver nanoclusters (Ag NCs). Ag NCs are ultrasmall NPs with core size less than 2 nm, and they contain 'countable' Ag atoms as cores and protected by a certain number of organic ligands. The atomically precise properties of Ag NCs provide a good platform for designing and manipulating Ag NCs at the atomic level to achieve optimized antibacterial efficacy, which is also beneficial for antibacterial mechanism research [6]. The effects of adding anatase nano-TiO_2, nano-SiO_2, etc. on the crystallization and morphology of C-S-H were systematically studied by Li H experiments. Further characterization was carried out by microscopy to investigate the effect of nanomaterials on the C-S-H morphology. Different nanomaterials have different C-S-H morphologies. Pure CSH is sheet-like structure, nano-TiO_2 is CSH and rod-like structure, nano-SiO_2 is CSH and particle agglomeration, and C-S-H and GO or CNT form a C-S-H structure grown on a template [7]. Although the above studies have promoted the research and application of nanomaterials to a certain extent, most of them are in the field of theoretical chemical reactions, and there are relatively few physical analyses of the buffering properties of nanomaterials. Therefore, this paper has important value and significance for the research on the body protector of buffer type nanomaterials.

The innovations of this paper are as follows: A new type of mesh plant fiber nanomaterial is proposed as a buffer protector, which has better buffer performance and can protect the key body parts of traditional martial arts trainers. And the relevant mechanical experiments were carried out on the nanomaterials, and the specific data obtained were used as the basis to make the results more credible.

2. Based on Buffered Nanomaterials

2.1. Buffered Nanomaterials

2.1.1. Nanotechnology and Nanomaterials

(1) Definition

The so-called nanotechnology refers to the general term of the manufacturing technology whose processing accuracy or processing size is one order of magnitude. The lattice spacing of metal crystal lattices is about 1 to 100 nanometers, so the precision of nanofabrication has reached the limit. Nanotechnology includes a variety of advanced science and technology, such as nanomaterials, nanofabrication, nanotribology, nanometer measurement, nanocontrol, nanoelectronics, nanomicroscopy, nanobiology, and a number of high-tech groups. Among them, bionanotechnology is a bottom-up molecular self-assembly strategy, and molecular components will spontaneously organize into stable structures [8, 9]. A schematic diagram of nanotechnology is shown in Figure 1.

Nanomaterials are materials that have at least one dimension in three-dimensional space on the nanometer scale (1-100 nm), nanomaterials are the basic units built around them. This corresponds to a dense scale of about 10 to 1000 atoms [10, 11].

(2) Characteristics of nanomaterials

Nanomaterials are some low-dimensional materials, and nanomaterials can be single crystal, polycrystalline, crystal structure, quasicrystalline or amorphous phase, glassy, metal, ceramic, oxide, or composite material [12, 13]. The manufacturing methods of nanomaterials include general artificial methods, artificial nanomaterials, reduction of single-phase products, heat treatment, and natural nanomaterials. Table 1 shows the characteristics of nanomaterials with different diameters.

(3) Classification

Nanomaterials can be mainly divided into nanoceramics, bulk, fibers, and powder materials according to their properties, as shown in Figure 2.

There is also a particularly familiar nanomaterial: nanomembranes, which are often used in cellphone screens or filters. Nanofilms are divided into particle films and dense films. Particle films are thin films of nanoparticles with very small gaps between them [14, 15]. The dense film is a thin film having a dense film layer with a particle size of nanometer scale. Nanomembrane can be used for gas catalysis (such

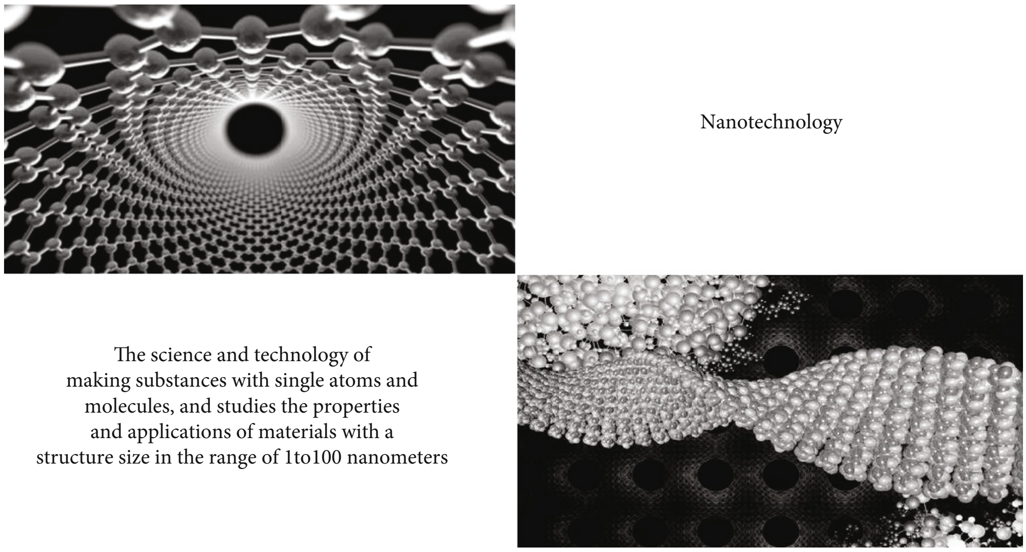

Figure 1: Schematic diagram of nanotechnology. Image source: https://www.sohu.com/a/415689238_120779191.

Table 1: Characteristics of nanomaterials with different diameters.

Diameter/ nm	Total number of atoms N	Percentage of the surface atoms
1	30	100
5	4000	40
10	30000	20
100	3000000	2

as automobile exhaust gas treatment) materials, filter materials, high-density magnetic recording materials, photosensitive materials, flat panel display materials, superconducting materials, etc. [16], as shown in Figure 3.

(4) Application fields of nanotechnology

At present, nanotechnology is widely used in many industrial, medical, energy, environmental protection, home and military fields, as shown in Figure 4.

2.1.2. Buffer Material. Buffer materials, as the name suggests, are elastic materials with a cushioning effect. At present, most of the research on cushioning materials is in the aspects of colloid, cotton, wool, leather, plant fibers, and mixed cushioning materials. The more typical ones are foamed polyethylene, foamed aluminum, cardboard fibers, etc., as shown in Figure 5. As a new type of environmental protection material, foamed polyethylene is more and more widely used in many fields, which has attracted the attention of many researchers on its cushioning, protection, and other properties. Due to its special electromagnetic shielding performance, sound insulation performance, sound absorption performance, energy absorption performance, vibration isolation, and damping performance, foamed aluminum materials are widely used in military equipment, shipbuilding, trains, automobiles, tunnel engineering, construction, and other industries. Waste paper fiber belongs to plant fiber, so the basic principle of using it as the main raw material to prepare buffer material is the same as the current domestic and foreign researchers using plant fiber to prepare buffer material. In both of them, the fiber material is mixed with other additives, and foaming is formed by the action of the foaming agent [17, 18].

The chemical theory of a plant fiber, the concept of liquid foaming, and the associated theory of surface chemistry are used to produce the network structure of the reticulated plant fiber material [19]. The key is to first use the pressure difference between the inside and outside of the bubble to form a cavity inside the material, that is, to “squeeze” the space out of the solution, while “squeezing” the space, let the fibers adsorb around the bubble and gather into “arches.” In order to make the material have the necessary physical and mechanical properties, the fibers should be connected, and before this, the “arch” fibers must be “oriented.” Under the combined action of hydrogen bonds and adhesives, an effective and stable connection between fibers is formed. When the solution is excluded, it becomes an ultralight-weight material with a plant fiber network structure that meets various properties. Figure 6 is a schematic diagram of the internal structure of the material similar to the “truss structure.” The truss in the truss structure refers to the truss beam, which is a latticed beam structure. The truss structure is often used in public buildings such as large-span workshops, exhibition halls, gymnasiums, and bridges. Since most of them are used in the roof structure of buildings, trusses are usually also called roof trusses [20]. Plant fibers constitute “truss members,” and the connection points between fibers with rubber compound constitute “truss nodes” [21].

2.2. Traditional Martial Arts. Traditional martial arts is a wonderful flower in Chinese history. It is deeply rooted in the fertile soil of Chinese culture. After thousands of years of development and precipitation, it is an important part of Chinese culture. Chinese martial arts can survive for thousands of years and maintain an active development trend. It is

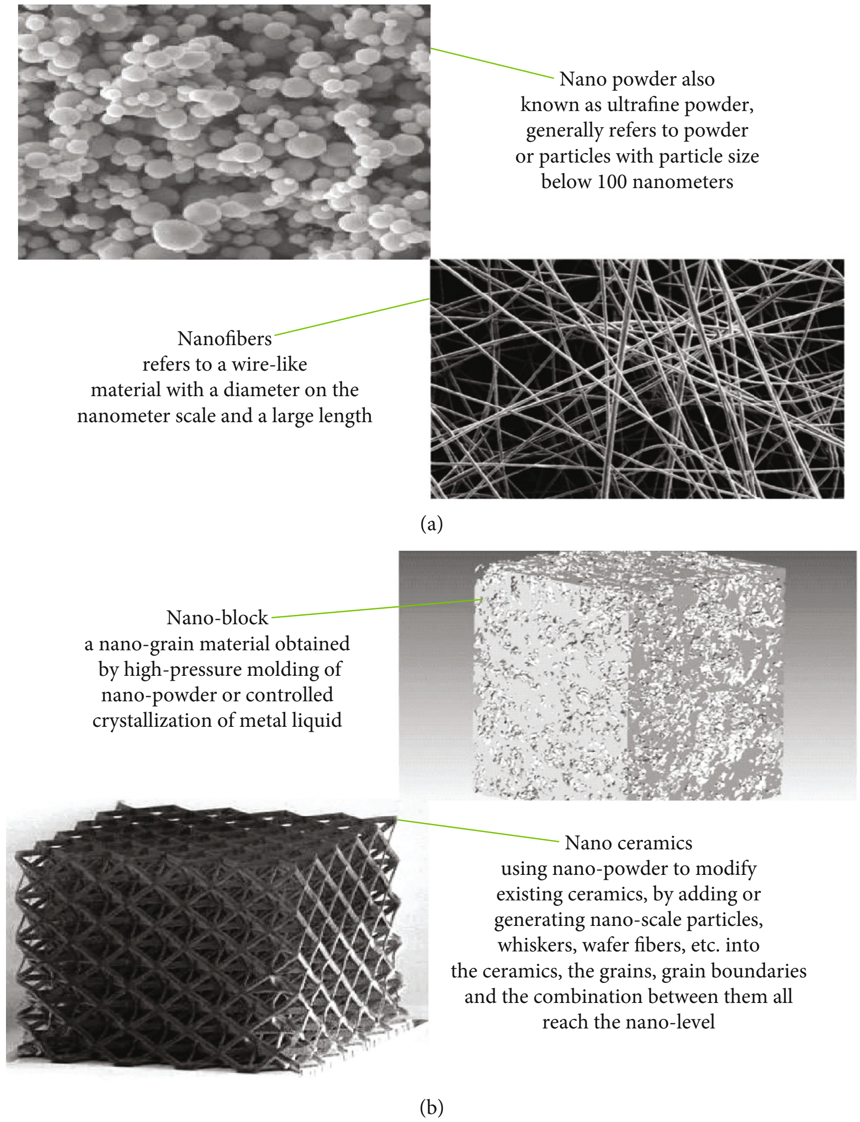

Figure 2: Common Nanomaterials. (a) Nanopowders and fibers. (b) Nanobulk and nanoceramic. Image source: http://www.ex-dna.com/a/news/company_news/151.html. Image source: http://www.520730.com/wanwuzhi/shoucang/530333.html.

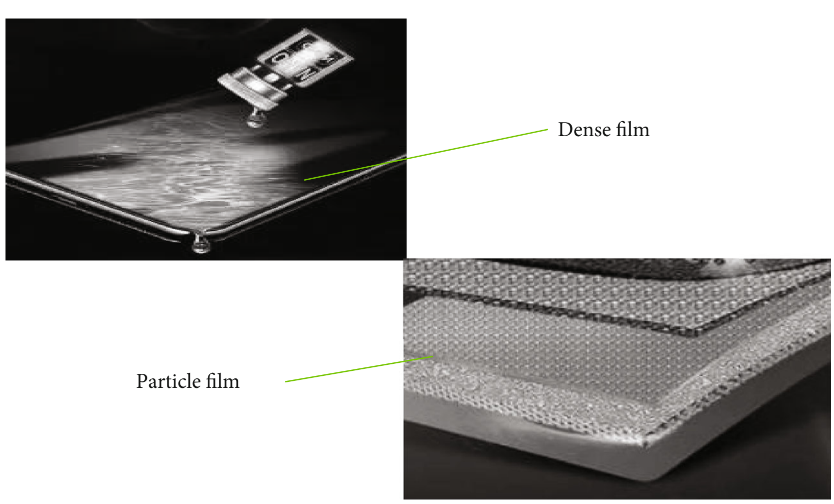

Figure 3: Nanofilm. Image source: https://www.smzdm.com/p/13577501/.

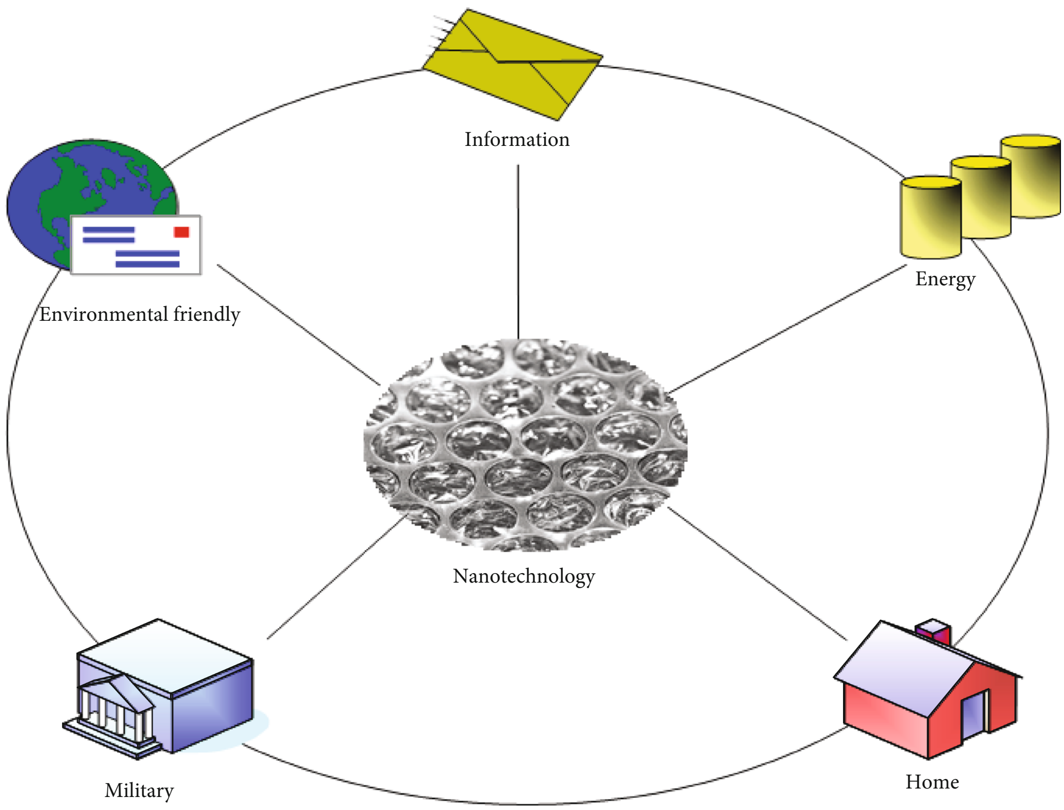

Figure 4: Applications of nanotechnology.

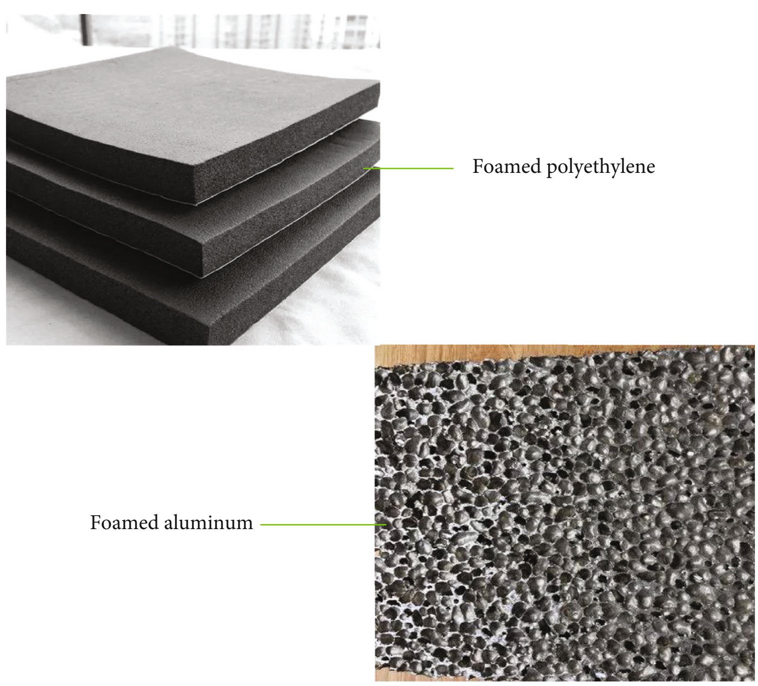

Figure 5: Buffer material. Image source: https://www.foodjx.com/chanpin/5042386.html.

fundamentally because it has rich traditional cultural connotations inside. However, in modern times, with the emergence and rapid development of Chinese competitive martial arts, the traditional connotation of martial arts has gradually become blurred, and especially the fighting ability, which is the essence of martial arts, has gradually faded out of people's

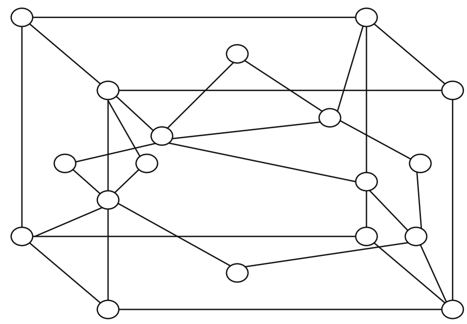

Figure 6: Schematic diagram of the internal structure of the mesh fiber material of the "truss structure."

attention, which has greatly misled people's understanding of martial arts. Due to the requirements of "high, difficult, new, and beautiful" put forward by competitive sports, in order to pursue the ranking and performance of the competition, traditional martial arts also excessively pursue the elegant movements and ignore the cultivation of its exercises, which has led to the fading of the cultural connotation of traditional martial arts. Figure 7 shows two traditional martial arts well known in China [22].

Tradition is to standardize and model a certain materialized spirit, so that living life can be condensed into rigid concept. It also restricts the life and practice of future generations, and becomes an example of their words and deeds. A "tradition" must have the following characteristics to be called a tradition. First, it has a long time span (time characteristics), and secondly, it has strong spatial binding force (regional characteristics), and thirdly, there are specific audiences (population characteristics). Traditional martial arts can be defined as follows: Chinese national fighting sports with a long history of development before modern China, with certain regional characteristics and practice crowds. Martial arts is a national sports event produced under the background of Chinese farming society, with tactical movements as the main content, routines, exercises, and fighting as forms of expression, focusing on both internal and external training. In terms of its time logic, traditional martial arts mainly refers to the martial arts before the old China, and it is the folk martial arts in the cold weapon era of ancient China. However, people only define traditional martial arts by time, which largely confuses the value and function characteristics of traditional and nontraditional martial arts. According to the value of martial arts, traditional martial arts and competitive martial arts correspond, but this ignores the existence of military martial arts, and only distinguishes them from the perspective of Western sports, and limits the value of traditional martial arts to the category of sports. Therefore, traditional martial arts exist not only in ancient times but also in modern times. It is developed by working people's long-term practice and accumulation. It has far-reaching implications and a long history. It takes traditional Chinese culture as the theoretical basis and takes offensive and defensive skills as the main purpose of activities. It combines physical fitness, self-defense, entertainment, and aesthetics, and it is a physical exercise with strong national traditional characteristics [23]. Table 2 is a comparison of the force methods of different types of boxing in traditional martial arts, and Table 3 is a comparison of the force methods of different boxing methods of the same type.

From Tables 2 and 3, it can be seen that for different martial arts, their moves are different, the force is also different, and the parts of the force used in battle and the strength and parts of the blow are different. Therefore, it is necessary to wear protective gear for important parts of the human body to prevent serious injury.

2.3. Body Protector. According to the relevant regulations of the General Administration of Sports of the People's Republic of China, the national and provincial competition rules for traditional martial arts include head guards, clothing, leg guards, guards, thin belts, and mouth guards. When these basic protective gears are used, none of them can participate in the competition, and they must pass the security check before the competition and stamped with the seal before they can be used during the competition. However, judging from the current domestic competition scene, protective gear and other equipment are rarely used. One team member believes that the protective gear will affect the performance and when the level of confrontation reaches a certain level, the protective gear basically cannot protect the participants, and the protective gear does not really play its role. At the same time, female martial arts athletes will use some protective gears in the competition process and daily training of athletes in order not to damage the body. Figure 8 shows several common body protective gears.

3. Static Tensile Experiments of Nanobuffer Materials

3.1. Mechanical Model of Nanobuffer Material. According to the compression characteristics of the buffer material, a set of modulus can be used to characterize its linear elastic properties, that is,

$$\frac{E^*}{E_s} = C_1\left(\frac{\rho^*}{\rho_s}\right)^2. \tag{1}$$

Among them, E^* is the elastic mode of the cushioning material, E_s is the elastic mode of the matrix, ρ^* is the density of the cushioning material, and ρ_s is the density of the matrix. C_1 is the scale factor.

$$\frac{G^*}{E_s} = C_2\left(\frac{\rho^*}{\rho_s}\right)^2. \tag{2}$$

Among them, G^* is the shearing die of the buffer material and C_2 is the proportional coefficient.

In the nonbombing phase,

$$\frac{{\sigma_{e1}}^*}{E_s} = C_3\left(\frac{\rho^*}{\rho_s}\right)^2. \tag{3}$$

Figure 7: Traditional martial arts. Image source: http://www.changjunwenhua.com/pic_detail.php?cid=2&id=48.

Table 2: Comparison of different types of force in traditional martial arts.

Fist name	Fist for example	Fist boxing method for example	Hard way
Straight-line boxing	Forward punch	South boxing: lunge step double punch boxing	Straight impact strength
Long curve boxing	Swing	Split boxing: a lotus hand	Curve whip
Short curve boxing	Hook	Fanzi fist: a wild horse running groove	Short-range impact

Table 3: Comparison of force methods of the same type of traditional martial arts and different styles of punches.

Boxing	Example action (punch punch)	Hard way
Eight extremes boxing	Hold the fist	In the storage of strength, cross-strength, a word to support strength
Taijiquan	Cover hands and punch with arm	Long storage strength, wrapped silk strength, elastic strength
Nanquan	Single butterfly step punch	Short storage strength, long inch strength, drill strength

Figure 8: Several common body protectors. Image source: https://shi222.sm160.com/Company/OfferDetail/1-000-7754-861.html.

Among them, ${\sigma_{e1}}^*$ is the elastic limit of the buffer material and C_3 is the proportional coefficient.

For plastic buffer materials, the ultimate strength is

$$\frac{{\sigma_{p1}}^*}{\sigma_{ys}} = C_4\left(\frac{\rho^*}{\rho_s}\right)^{3/2}. \quad (4)$$

Among them, ${\sigma_{p1}}^*$ is the collapse limit of the buffer material and σ_{ys} is the yield strength of the matrix.

For a two-dimensional closed-cell buffer material, when it is compressed, its stress is:

$$\sigma = \sigma_{ys}\left[C_1\left(\frac{\rho^*}{\rho_s}\right)^{3/2} + C_2\frac{\rho^*}{\rho_s}\right]. \quad (5)$$

Table 4: Experimental equipment.

Equipment name	Model	Performance
Electronic balance	MP200-II	Capacity 180 g/0.02 g
Oven	Universal	1 m^3 5 kw
Digital microscope	US MOTICDMEB5	1.3 million pixel objective lens: oil lens 100x eyepiece 5x
Environmental scanning electron microscopy	Netherlands XL30 ESEM-TMP	The resolution is 25 cm under 1KV voltage
Fourier infrared spectrometer	American Nicoli 360 intelligent	4000-400 cm^{-1}
Compression box	2	According to packing cushion material creep characteristics
Blender	7312-I	Manufactured by experimental method

The relationship between porosity and density is

$$P = \left(1 - \frac{\rho^*}{\rho_s}\right) \times 100\%. \tag{6}$$

Substitute into the previous formula to get

$$\sigma = \sigma_{ys}\left[C_1(1-P)^{3/2} + C_2(1-P)\right]. \tag{7}$$

That is to say, the porosity is inversely proportional to the strength of the buffer material.

For a buffer material, its ability to absorb energy can be expressed as

$$W = \int_0^\varepsilon \sigma d\varepsilon. \tag{8}$$

In formula, W is the absorption force per unit volume and ε is the strain.

Its ideal energy absorption efficiency is

$$I = \frac{1}{\sigma_{\max}} \int_0^\varepsilon \sigma d\varepsilon. \tag{9}$$

For the constitutive formula of the nanobuffer material, the constitutive relation of ben'gou materials mentioned in this paper is a mathematical model, which is an abstract reflection of the macroscopic properties of materials. One of the core tasks of studying the mechanical properties of materials is to establish constitutive equations that can describe the mechanical responses of materials under various loads. The parameters of the material constitutive equation are determined by a certain range of strain rate and temperature experiments, and the correctness of the constitutive equation can be verified by comparing the predicted value of the constitutive equation with the experimental results; it can be expressed as

$$\sigma = f(\varepsilon, \varepsilon^*, T). \tag{10}$$

For its mechanical properties, it can be expressed as

$$\sigma = (A + B\varepsilon^n)(1 + Cln\varepsilon^*)(1 - T^m). \tag{11}$$

The compressive stress-strain constitutive relation for the buffer material is

$$\sigma = E_0 f(\varepsilon). \tag{12}$$

In formula, E_0 is the initial modulus, $f(\varepsilon)$ is the shape function, and it has

$$f(\varepsilon) = \varepsilon\varphi(\varepsilon) = \varepsilon(a\varepsilon^{-p} + b\varepsilon^q). \tag{13}$$

If the factor of strain rate is introduced, and $f(\varepsilon)$ is regarded as the series, the constitutive relation is

$$\sigma_c = E_0(\varepsilon^*)f(\varepsilon). \tag{14}$$

In formula,

$$E_0\, \varepsilon^*) = k\varepsilon^*, \quad f(\varepsilon) = \sum_{i=0}^{10} A_i \varepsilon^i. \tag{15}$$

Considering that the strain rate factor is related to the strain, the more complete constitutive formula is obtained as

$$\sigma_c = M(\varepsilon, \varepsilon^*)f(\varepsilon), \quad M(\varepsilon, \varepsilon^*) = \left(\frac{\varepsilon^*}{\varepsilon_0^*}\right)^{n(\varepsilon)}. \tag{16}$$

In formula, ε_0^* is the static strain rate and $n(\varepsilon)$ is a linear function:

$$n(\varepsilon) = a\varepsilon + b. \tag{17}$$

3.2. Static Tensile Test. In this paper, the nanobuffer material within a certain density range is selected for stress testing at different strain rates. The density range is between 1 and 20 nanometers. The test conditions are as follows: temperature $T = 20°C$, relative humidity 75%, and the load is gradually increased to the limit on the test sample along the thickness direction at a speed of 10 mm/min. The experimental equipment is shown in Table 4.

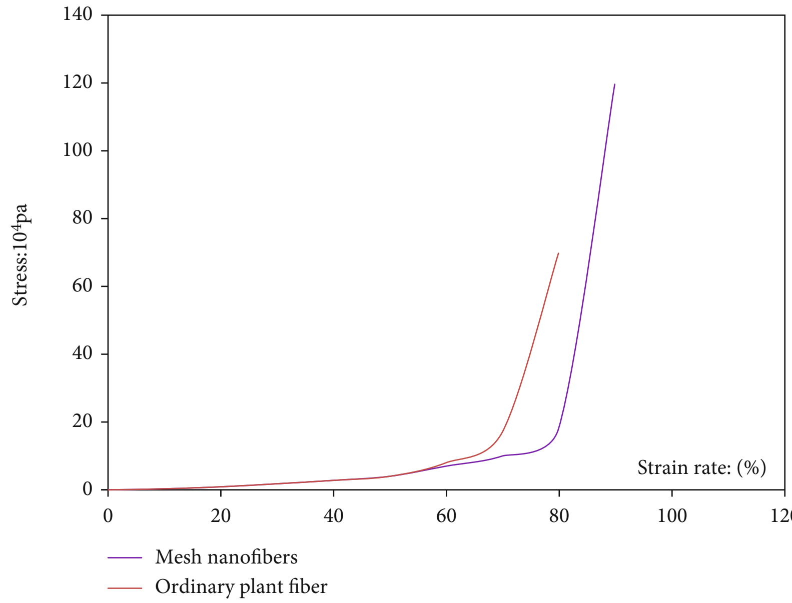

FIGURE 9: Stress comparison of buffer materials.

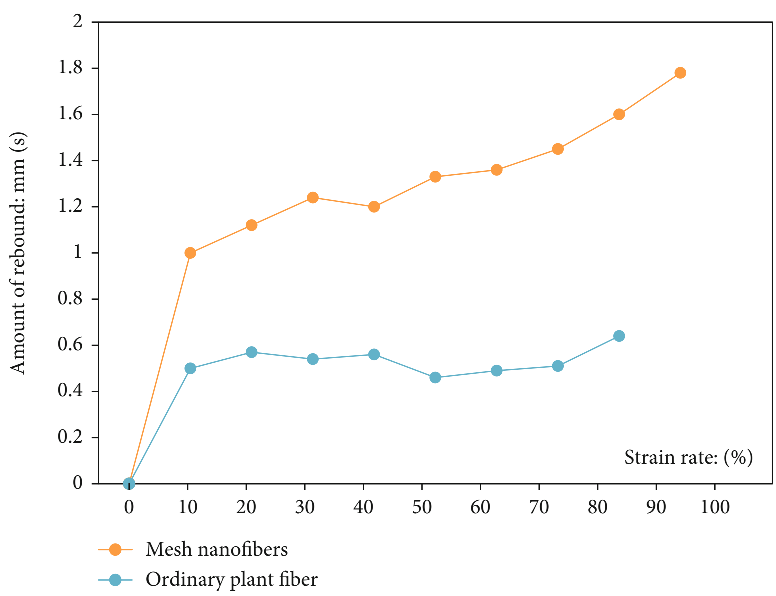

FIGURE 10: Comparison of resilience performance of cushioning materials.

The basic process of this paper is first to stretch and test the test sample according to the experimental equipment in Table 4. The stretching method is to gradually increase the load and record the stretched length of the buffer material in the process and then calculate the strain diagram according to the equation and then slowly withdraw the recovery length of the material and then calculate the rebound curve of the material according to the equation.

The strain curve is obtained according to the previous constitutive formula, and compared with the common fiber material, the results are shown in Figures 9 and 10.

According to Figure 9, it can be seen that the mesh nanofiber material can withstand a pressure of 1.2 million Pa under 90% strain, while the ordinary fiber material can only withstand a pressure of 700 kPa under 80% strain. It can be seen that the use of mesh nanofiber materials can significantly improve the bearing capacity of stress. According to Figure 10, it can be seen that the resilience of the meshed nanofiber material is significantly higher than that of ordinary fiber materials. Under 90% strain, its resilience reaches 1.8 mm/s, while the maximum of ordinary fiber materials is only 0.6 mm/s. It can be seen that the mesh nanofiber material can significantly improve the stress bearing capacity of the protective gear and improve the rebound effect.

4. Discussion

Although the experiments in this paper have specific evidence that the mesh nanofiber material can significantly improve the stress bearing capacity of the protective gear and improve the rebound effect. However, there are still some shortcomings:

(1) In practice, some buffer materials will rupture due to too fast drying or excessive external force during the drying process, or due to too slow drying, small bubbles will merge into large bubbles, which will affect the shape of the space inside the material. And it will cause internal stress defects and thus affect the strength of the sample, which should be strengthened on the drying process

(2) It is recommended to conduct further research on the microscale of the pores of the buffer material and the size of the truss structure

(3) The recovery performance and compressive stress performance of cushioning materials with different densities will be different. Further experiments are needed to analyze the cushioning and resilience performance of materials under different densities, and verification tests should be carried out for this material

(4) In this paper, only the resilience and compressive stress of the buffer material are tested, and some characteristics of the buffer material need to be further discussed and studied

5. Conclusions

In the abstract, this paper first gives an overview of the overall content of the full text and then introduces the background of traditional martial arts in the introduction and introduces the protective effect of buffered nanomaterial protective gear on martial arts trainers. Then, the innovation points of this paper are summarized, and some related researches are listed in the related work part, so as to understand the current situation of the related content of this paper. Then, in the theoretical research part, the definition, characteristics, classification, and application fields of buffer nanomaterials are first introduced, and then, the relevant content of buffer materials is introduced, and the characteristics of traditional martial arts and the force application methods of different martial arts are introduced. Then, introduce the related content of body protector. Finally, the stress bearing performance and resilience performance of the mesh nanofiber material and ordinary fiber material are tested by mechanical experiments. It is concluded that the mesh nanofiber material can significantly improve the stress bearing capacity of the protective gear and improve the rebound effect, which can better provide safety protection for traditional martial arts trainers. In the future development, nanomaterials will be more and more widely used, such as the addition of nanoparticles to the martial arts protective ware of textile and chemical fiber products, which can remove flavor and sterilization. Although the chemical fiber material is strong, but there are annoying electrostatic phenomenon, adding a small amount of metal nanometer particles can eliminate the electrostatic phenomenon.

Data Availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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