

Gansu Tianxing Rare-Earth Functional Materials Co., Ltd.

GaTianxingTi (for short), founded in June 1998 by Chen Zheng (Chairman of the Board), is a private company. It's self-funded, self-financed, and self-managed with fixed asset of about US\$ 16 million.

Tianxing's development policy: **concentrate** on the research, development and production of rare-earth functional materials and applications to promote the nation's hi-tech industry.

From the very beginning, Tianxing focuses on rare-earth magnetostrictive materials – the smart materials of the 21st century – launches a great deal of research and experiment with persistent effort. After hundreds of experiments, Tianxing established its own production assembly, perfected its technique, and, most important of all, produced Tb-Dy-Fe series giant magnetostrictive materials of high performance and «jump effect». The new product is fairly competitive with other leading companies from the standpoint of technique, product performance, quality as well as production scale. Support, encouragement, and attention flooded in from everywhere. Meanwhile, Tianxing's extraordinary research and experiments in effort to explore further in the field of giant magnetostrictive materials devices have won great honor (gold medal) at the 8th National Fair for Patented New Technology & Product.

Unprecedentedly, Tianxing set up series of standards and regulations to direct its operational management of quality control, Tianxing has adopted the ISO9001 quality control system and proudly been authenticated by CQM- QCC.

Tianxing's quality policy: **develop** carefully, **manage** strictly.

As a private company, Tianxing thinks highly of the establishment and perfection of its own culture, especially of improving the whole system, carrying out the training plan for employees while creating the atmosphere for encouragement and competition. Because Tianxing's treasure is every individual employee, a team of fine quality and high efficiency is the source of strength. Tianxing is always willing to learn from those of great ability and integrity. At present, Tianxing is composed of highly-skilled professionals many of them have won provincial or national prizes.

For a greater future, Tianxing has been working closely with other corporations or academic institutions (i.e., Lanzhou University) to dig more deeply and vigorously into the amazing field of giant magnetostrictive materials.

Rare-Earth Giant Magnetostrictive Material

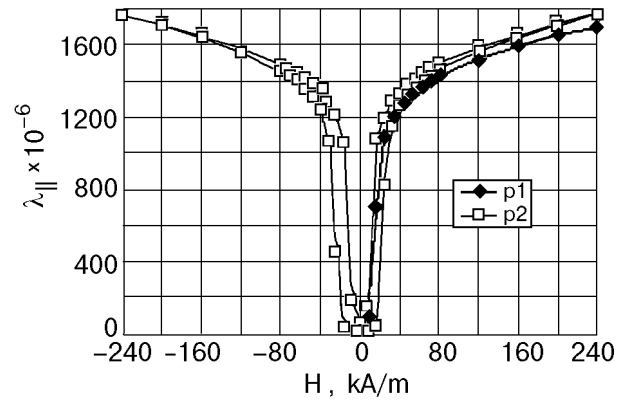
Large Strain *High Power Output*
Low-Voltage Operation *Micro-Second Response*
Broad Bandwidth *Precision Control*
Wide Usage Temperature *Extreme Reliability*

For many years it's known that material can change its shape in the presence of magnetic field. The birth of giant magnetostrictive material unfolded a brand new world to people, it's the material of great magnetostriction and power output, the limit of modern technology and engineering will be definitely redefined.

Giant magnetostrictive material is an alloy mainly composed of terbium, dysprosium and pure iron. It can change electrical energy directly into mechanical action or vice versa because of its merit as being sensing and actuating material. Even working under low voltage, the strain it can produce is 40 times higher than traditional magnetostrictive materials.

After one year of hard work and persistent effort, TX successfully accomplished the technique of producing Tb-Dy-Fe giant magnetostrictive material, established complete production facilities with an annual output of 5,000 kg and a Testing & Analysis laboratory. Combined with other techniques, such as vacuum melting, directional crystallization (Bridgman method and Free standing zone melting), crucible cooling, and series of state-of-art technique, the production conditions and crystallization process are strictly controlled, products of high performance and stable quality are produced (rod, disc, rectangular solid, pipe and other shapes upon request. Dimensions for rod: diameter 5–50 mm).

The pictures of product and its characteristics.



The Application of Tb-Dy-Fe Giant Magnetostrictive Material

Because of the following characteristics of the giant magnetostrictive materials (large strain, high reliability, large energy density, fast response speed, broad response bandwidth, and intelligent response), it makes a tremendous breakthrough in the application of the products that can change electrical or magnetic energy into mechanical action or vice versa. It's one of the leading yet unsubstitutable materials in scientific and engineering field. Of the earliest application of this material, one is underwater SONAR, which brought up the best quality ever with the detection range that can reach as far as 10,000 km (compared with that of the traditional ceramic piezoelectric SONAR, that is 300 km the farthest). When applied to aircraft, this smart material makes a smart wing, which can be controlled much faster with enhanced reliability.

The industrial application of the giant magnetostrictive material includes machinery, electronics, oil industry, textile, and medical instruments, ultra-high precision machine tool, robot, active vibration damping, linear motor, high-speed valve, hydraulic/pneumatic servo-valve, car-use oil-injection pump, spinning needle (driver), ultrasonic cleaning, ultrasonic machining, medical sonic and ultrasonic tools, precision instrument, optic disc driver, printer, etc. Tb-Dy-Fe material incorporated micro-positioning system that can be used in engraving of integrated circuit resulting in much higher integration and reduced size. It's for sure that the magnetostrictive material will influence greatly electronics and other industries.

As to our daily life, the magnetostrictive materials can be applied to the products like camera shutter, hearing aid, hi-fi loudspeaker etc.