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NANO TENSILE TESTING DEVICE

This novel, patent pending nano tensile testing device allows the quantitative and qualitative investigation of viscoelastic material properties of nano- and microfibers (e.g. collagen fibrils) in large quantities and in different media. The force sensor can be used again immediately after a test has been completed, thus significantly increasing the accuracy of the measurements, as well as the throughput to at least 50 samples per week.

BACKGROUND

The most common method currently used to perform tensile tests on nano- to microscale fibers allows a maximum of two samples per week to be measured with an Atomic Force Microscope (AFM). Other methods achieve a throughput of 4-5 samples per week, but have further limitations, which makes dynamic and force-controlled measurement with high precision impossible at present.

The new method allows fast coupling and uncoupling of nanoscale fibers and thus an increase in the number of tensile tests by at least a factor of 20, making a quantitatively relevant measurement of the tensile mechanics of collagen fibrils possible for the first time.

With AFM any kind of sample can be analyzed, e.g. polymers, adsorbed molecules, films or fibers and powders in air or liquid. Applications include material sciences, life sciences, semiconductors and electronics and others (e.g. solar cells, geosciences, forensic sciences, food technology), academic institutions and research institutes.

In general, any indentation measuring device could be equipped with the presented invention in order to scientifically test material characterization or the effectiveness of new products: e.g. collagen fibrils synthetic and natural nanofibers, such as cellulose fibers, silk, viscose natural and synthetic fibers.

Fig 1: Tensile testing device – pick up

ADVANTAGES

- Enables high torque transmission for miniaturized applications Only
- standard permanent magnets are required
- Up to 40% higher torque transmission compared to an axial acting magnetic coupling
- Smaller moments of inertia than radial acting magnetic coupling
- Easier design of parts than a radial acting magnetic coupling Reduced
- axial loading of bearings compared to an axial acting magnetic coupling
- axial and radial acting forces are continuously variable

REFERENCE:
M011/2020

APPLICATION:
The invention is applicable where torque transmission over hermetically separated distances at minimized dimensions is required. For example, in a blood pump.

DEVELOPMENT STATUS:
TRL 3, Proof of concept

KEYWORDS:
nanofibre material testing, collagen fibrils, tensile test

IPR:
AT patent filed

OPTIONS:

- R&D - Cooperation
- License Agreement

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