

Measurement of: Nano-mechanical properties of solid thin films of amorphous and crystalline materials as well as bulk solids.

Equipment: TRIBOMETER WITH HARDNESS TESTER, Model : IBIS-B, Australia

Property Measured: Hardness and Elastic Modulus of amorphous and crystalline bulk solids and solid thin films can be measured

Photograph (small size)



Tribometer (Nanoindenter)

Basic Principle: The tribometer (nanoindenter) is a mechanical microprobe capable of touching the surface of very small volumes of materials in a prescribed manner and measuring the mechanical properties in nano scale. The tribometer is designed to impart a controlled load to a precisely shaped indenter in contact with the specimen surface. The mechanical response of the material is measured via force and displacement sensors in the form of a “load-displacement curve”. The range and resolution of the actuator, force and displacement sensors, is very small (in the mN and μm range with nN and nm resolution). There is a very small impression left in the specimen surface thus, making the technique useful for tests on specimens which cannot be destructively tested. The precise nature of the measurement enables events on the micro to nano scale to be recorded. Macro-scale damage can thus be interpreted and explained by events on the sub-micron scale thus allowing the fundamental properties of the materials to be studied and tailored for specific applications.

Capabilities: The Nanomechanical properties such as elastic modulus and hardness of thin films, multi-phase metals and ceramics, teeth, bone, etc can be measured. Tribometer can also be used for visco-elastic measurements of polymers, flexure testing of MEMS and any application involving mechanical measurement on the nanometre scale.

Sample Requirement: Surface of the specimen samples must be flat and smooth. Bulk samples, with 1 cm X 1 cm area and 1 mm to 5 mm thick. Thin films on 1 cm X 1 cm area and 1mm to 5 mm thick substrates