

CB500 Nanoscratch Mechanical Tester

Principle:

The CB500 Nanoscratch mechanical tester utilises a variety of diamond indenter tips to characterise sample hardness, adhesion, CoF, and surface failure.

Indentation and scratch are the primary analytical methods. Indentation involves applying specified load (mN) to the sample surface via the indenter tip. When the desired load is reached, the indenter resets to its original position and the sample hardness is calculated automatically.

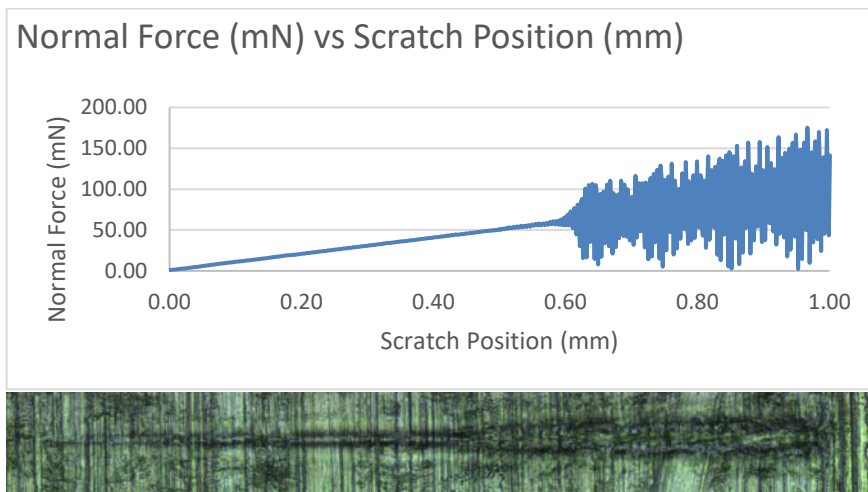


Figure 1: 1 mm Scratch with Progressive Load (1-100 mN), and Microscopic Image of Scratch with Surface Failure.

Scratch testing can be performed using a constant load (load remains the same throughout) or a progressive load (load is increased throughout the scratch at a specified rate).

The CoF, normal force, frictional force, and true depth can be obtained post scratch and correlated to a microscopic image taken of the respective scratch. Moreover, these tests can be performed in a bio-cell to facilitate submerged analysis in a solution of choice. The bio-cell can be temperature controlled, allowing for the chosen solution to be heated to a desired temperature.

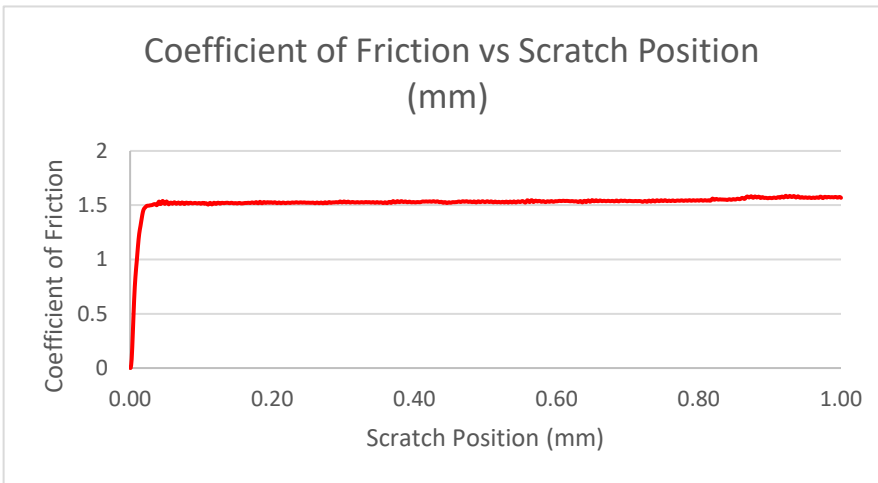
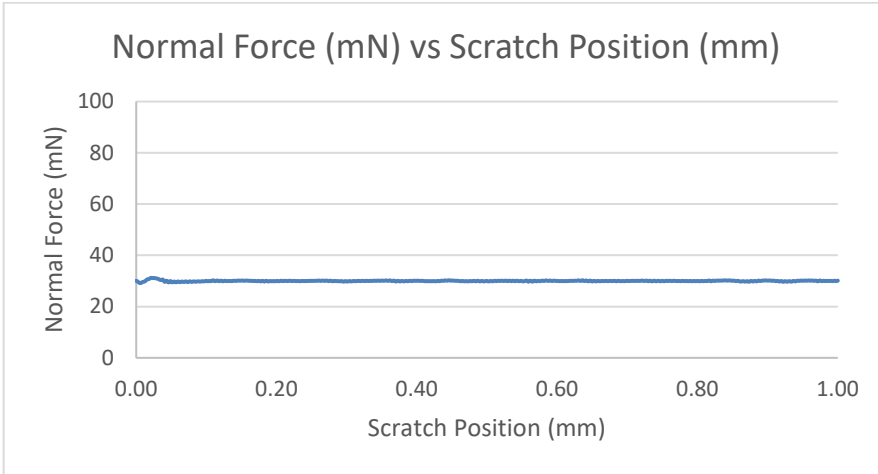
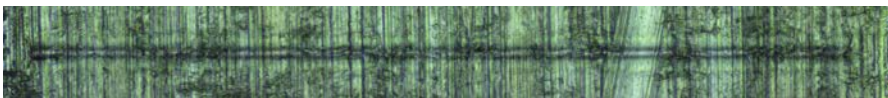


Figure 2: 1 mm Scratch with Constant Load (30 mN), and Microscopic Image of Scratch with Surface Failure.





Instrument Description

Sub Folder: Physical Analysis



Current model:

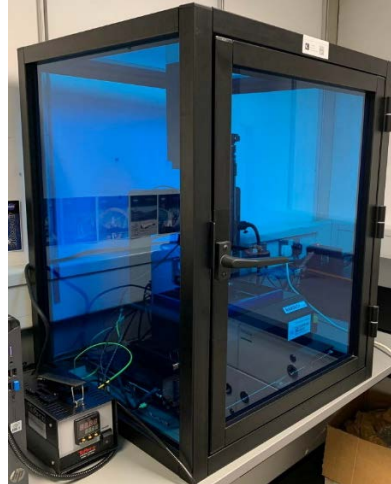
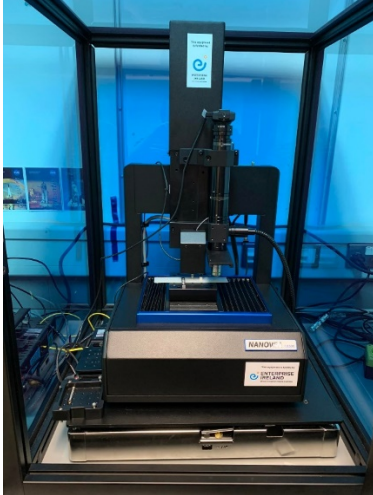


Figure 3: CB500 Nanoscratch Mechanical Tester and Isolation Chamber

Video link: <https://www.youtube.com/watch?v=8kknQhKL2mo>

CB500 Nanoscratch Mechanical Tester:

The test can be conducted using a variety of indenters. CREST have both berkovich and conical indenters.

Berkovich indenter is a three-sided pyramid which is geometrically self-similar.

The conical indenter is used for scratch testing. The conical indenter tip has a sharp, pointed end in the shape of a cone. The simplicity of its cylindrical symmetry makes it suitable for scratch testing, and wear testing.

Samples:

Recommended samples consist of a metal substrate, with a coating: in case of a multi-coat system, each coating must be tested separately.

The coating may be a paint, a varnish, sol-gel, polymers, or other related product. These coatings must have a thickness greater than $1\mu\text{m}$ to allow for accurate scratch and indentation analysis.



Instrument Description

Sub Folder: Physical Analysis



Standards:

Samples can be assessed in accordance with international standards such as:

- Hardness and Elastic Modulus - ASTM B578, ASTM E2546, ASTM E384, ASTM D2979, ASTM D2240, ASTM B933, ISO 14577, ISO 7619, DIN 50359, JIS K7215
- Adhesive Failure - ASTM C1624, ASTM F2496, ASTM D2197, ASTM D7027, ISO 20502, ISO 1518
- Multi-pass wear - DIN EN 1071

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