

Mechanical characterization in the micro and nano range as a tool for the extension of product durability and the reduction of energy consumption,
Dr. Thomas Chudoba, ASMEC GmbH

The weakest part in a group of components is deciding about the service life of a product. For parts in sliding or rolling motion against each other this is mostly the surface. The resistance of a surface against mechanical stress can be improved by coatings of only a few micrometer thickness. Additionally, coatings are used for friction reduction which is associated with a reduction of the energy consumption.

The optimization of surfaces by coatings is impossible without reliable and comparable measurements for the mechanical characterization. A nanomechanical tester like the ZHN of ZwickRoell is used to measure a multitude of mechanical properties like hardness, elasticity, friction coefficient, coating adhesion as well as fatigue and wear behavior. In the presentation it will be explained how coatings can be characterized by static and dynamic test methods and which requirements the test equipment has to fulfill. Several application examples will be given where such an instrument is used for a surface and coating optimization.