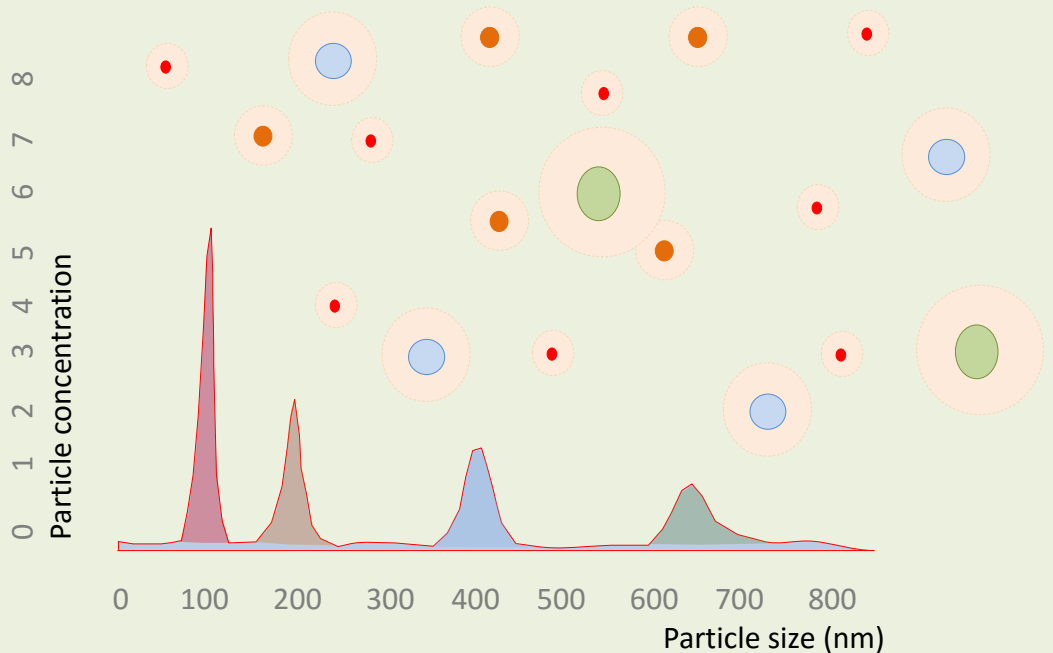


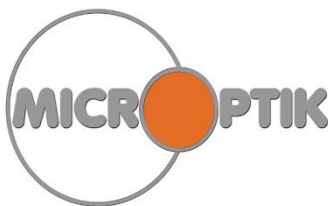


Analyzing Nanoparticles

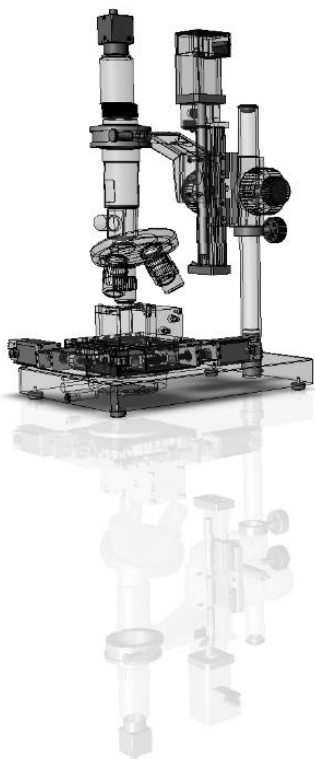


More information! | Ask our sales representatives for more information. info@microptik.eu

© MicroOptik BV 2015



The art of innovation



Morphious Nano-Insight

The **Morphious Nano Insight** is designed to visualize and analyze particles in liquids that relates the rate of Brownian motion of particles to the size distribution. The technique is using so called Nano particle Tracking Analysis (NTA) where images of nano particles are generated through a laser scattering device (**Nano-Insight**) in conjunction with a so called **Ultra Microscope** and NTA software.

Nano Insight

The **Nano Insight** module is a device which allows a specific laser to interact with a specific liquid in which particles are immersed.

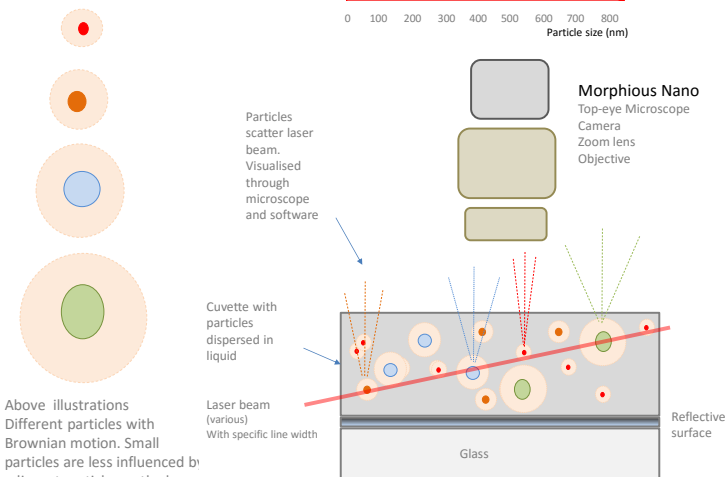
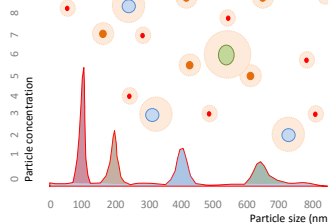
The **Ultra Microscope** is a digital video microscope specially designed to capture the light scattered by the particles.

NTA software is software designed to track particles. In nature there are various ways particles can move in a liquid medium. The Micropik NTA software allows various Tracking algorithms to be used.

Principles of *Morphious* Nano-Insight

Tracking nano particles

With the **Nano-Insight** laser scattering module, nano particles in liquids can be visualized through the **Top-eye Ultra Microscope**. The particles, depending on what laser used, are manifested as Fuzzy dots in a matrix. Dots which are moving in accordance with its respective Brownian motion.



Above illustrations Different particles with Brownian motion. Small particles are less influenced by adjacent particles as the large particles. Hence larger particles have large Fuzzy appearance in Ultra microscope image. NTA can track the respective paths of the particles.

The **Nano-insight** module. This module is designed such that it can be mounted on the baseplate of our Ultra Microscope, the **Top-eye nano**. The module can be controlled through our **Mishell Software**. The software controls the **Nano-Insight** module as well as the camera. The **Nano-Insight** module is equipped with either one or more lasers depending on the application. The laser is arranged in a particular way. The diagram of the **Nano-insight** is shown on the top right diagram of this page. The smaller particles move faster than the bigger ones.

We track each particle simultaneously with the camera.

The **Top-eye Ultra Microscope** visualizes the scattered light into fuzzy dots. With appropriate time resolved tracking the Fuzzy clouds can be assigned and related with the respective particle sizes. The images of the Brownian motion of the particles are unique. See example on this page below. Each Fuzzy dots represent individual particles.

NTA software

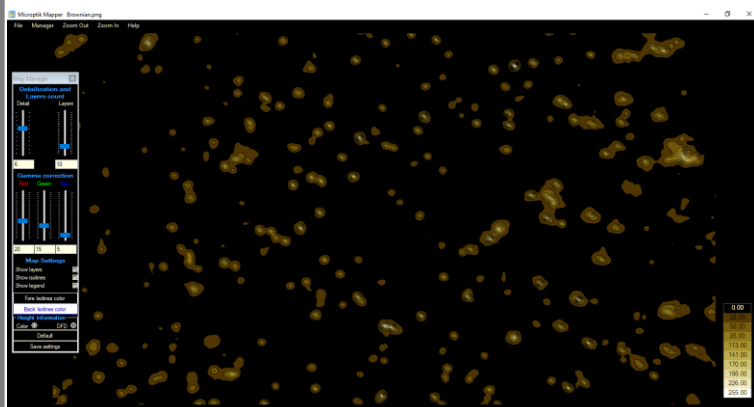
The image on the bottom side of this page shows a typical image of a NTA analysis. The scattered laser light is captured into fuzzy points which are tracked in function of time. We follow each individual Fuzzy point.

As the method is following each particle individual the resulting technology is high resolution. As we know the volume related with the image we are looking at, we can determine with extreme accuracy the concentration of various particles.

Applications

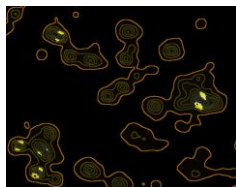
The technology offers a wealth of possible applications. For example it is also possible to use a fluorescent laser. In this way one can target particles in a complex matrix. The benefit if this technology is that the user can visually inspect and validate all possible applications by looking at the respective images.

Morphious Nano-Insight
The art of innovation





The art of innovation



MiNan[®]

A sophisticated Image analysis and particle size characterization software module for data acquired with Morphious Nano-Insight. NTA analysis and all possible applications. MiNan is a module within Mishell[®]

Mishell[®]

Is perhaps the most sophisticated Image analysis software package available on the market today. Simple to use and incredible sophisticated when it comes to the specific application. Mishell has originally been designed to control an Image analyzer system developed by MicroOptik in conjunction with an Image analysis task. Still as to day this conjunction is valid. The software is delivered with all machine vision systems our company provides. However, as more and more clients became to realize the capabilities of the software we have offered our clients and others the software as a stand alone product. Therefore all the beautiful image analysis tools are available for that application in a unique package.

The complete **Mishell** package consists of the following building blocks: **MiCam** (camera interfacing), **MiMea** (2D measurements, size and shape parameters, profiling), **MiDab** (database), **MiMap** (contour plots), **MiReg** (reporting), **MiVim** (3D visualization), **MiPis** (particle size analysis), **MiFis** (fiber inspection), **MiMis** (morphology) **MiPor** (pore size analysis). Last but not least **MiNan**, a sophisticated image analysis package for Nano particles tracking and characterization. Each of these blocks have unique features related to the **MiAp** (MicroOptik, Image Analysis Application). **Mishell** can interact with many devices. Through Micam, Mishell can interact with practically any camera system on the market. Beyond that it can also be used to integrate all sorts of instrumental control features, like stepper motor -, heating & cooling-, illumination-, temperature, IO- boards and many more. This is convenient for clients who want to set up a machine vision project. All has been programmed and the client simply has to connect all the devices with the wizard which comes with the package.:



Image analysis with Heating & cooling stages

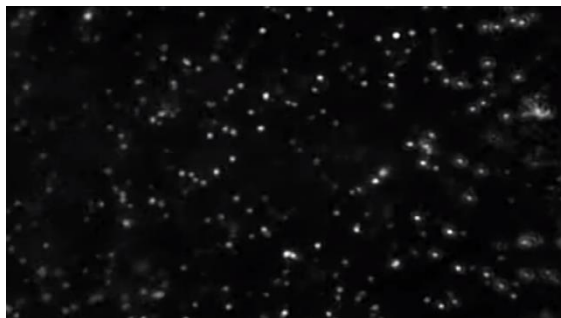
Image analysis with complex robotic systems

Image analysis & Sophisticated motorized axis control

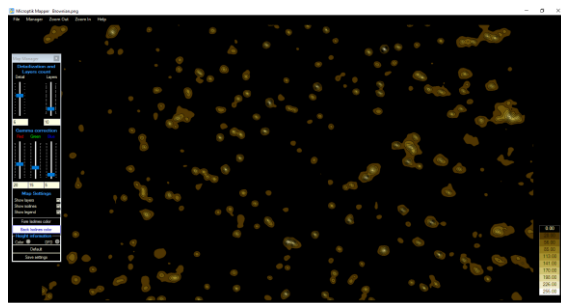
Mishell links all hardware components together and makes it working as one analyzer system

MiNan Nano Particles Image analysis Software a sophisticated Tool for Nano particles characterization

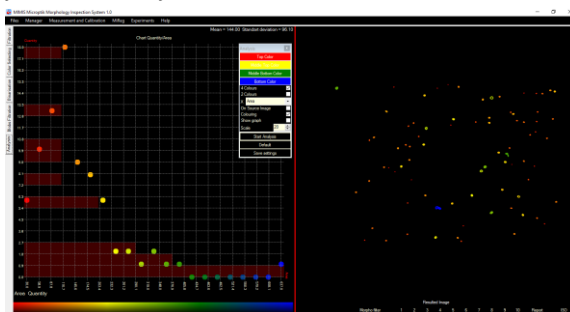
The MicroOptik Mishell Image analysis software package is the most sophisticated software of its kind available in the market. MiNan is a Subroutine which allows full characterization of *Morphous* Nano particles analysis.



Raw Image of Brownian motion particles acquired with *Morphious* Nano-Insight



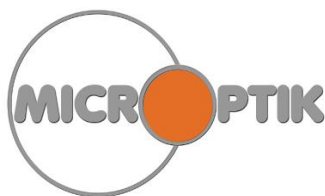
Tracking of Brownian motion and further characterization



Particle characterization, Histogram with false color mapping. Color related with size of particle. This is one of the many features **MiNan** offers.

MiNan is the software which comes with a *Morphious* Nano system and is developed to visualize and measure nano particles size and shape (morphometry) and concentration. Each particle is individually but simultaneously analysed by direct observations of diffusion. This particle-by-particle methodology produces high resolution results for particle size distribution and concentration while visual validation gives users extra confidence in the data. As well as particle size and concentration, protein aggregation and viscosity can all be analysed while a fluorescence mode provides detection of labelled particles

More information! Ask our sales representatives for more information. info@microptik.eu © MicroOptik BV 2015

System specification *Morphious* Nano-Insight

The art of innovation

Applications with *Morphious* Nano-Insight:

In Pharmaceutical or composite industry to develop drugs.

- *for example for viral screening*
- *for developing Nano-biomarkers or toxicology screening*
- *for studying kinetic models in protein aggregation*
- *for studying diseases through Extracellular vesicle characterization*
- *for characterisation of building blocks in Nano composite material development*

Key Benefit of Morphious Nano Insight:

- *High throughput characterisation of many particles at the same time*
- *Real time visual display of particles allowing user to assess experiments without extra complexity.*
- *Convenient and easy to use software allowing user to set up any experiments through macros.*
- *Add on accessories like high throughput auto samplers, pumps or heating & cooling*
- *Adaptive modular systems to build any complex application allowing operation to be easy and comfortable*
- *Utterly efficient and low cost of ownership*
- *The system offers high resolution particle size characterisation to investigate complex multi dispersive matrixes.*
- *Choice of laser wavelength*
- *Adaptive fluorescence analysis by adding a motorized wheel with filters.*

Key specifications:

- *Size 10 nm - 2000 nm**
- *Concentration 10^6 - 10^9 particles per mL*
- *Fluorescence detection*

Temperature Range	15-40 °C
Power Supply	230V AC/115V AC, 50/60 Hz
Camera	USB 3 CMOS resolution: 1936 x 1216, 161 f/s, Pixel size 5.86 µm: Color calibration module.
Power consumption	18W
Laser wavelengths	405 nm (Violet), 488 nm (Blue), 532 nm (Green), 642 nm (Red)
Size range:	From 10 nm till 2000 nm (depending on material)
Focus	Computer controlled motorized focus
PC	SDD SanDisk Ultra II SDSSDHII-120G-G25 HDD Western Digital Blue WD10EZEX 1 TB Motherboard Gigabyte GA-Z97X-UD3H RAM Kingston HyperX Fury Black HX318C10FBK2/16 16 GB DDR3-RAM Processor Intel® Core™ i7 i7-4790K Quad Core 4 x 4.0 GHz Graphics Card PNY VCQK2200-PB 4 GB Power supply Coolermaster G750M 750 W PC box Cooler Master Black
Software	Windows® & (or higher). Powered by Mishell® Mishell is a registered trademark of Microptik BV Windows ia a registered trademark of Microsoft corporation MiNan sophisticated routine runs under Mishel to fully characterize nano particles acquired with Morphious Nano
Dimensions (LxWxH)	20 x 18 x 30 cm
Weight	10.5 kg

More information! Ask our sales representatives for more information. info@microptik.eu