

unitester

Bevonatok és funkcionális filmek száradási vizsgálata

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ügyvezető

HUNGAROCOAT

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- **Unitester Kft.**
- **Bevonatok áttekintése**
 - **Kihívások**
 - **Igények és lehetőségek**
- **Méréstechnika: NMA**
 - **Eredmények értékelése**
- **Alkalmazási példák**



Unitester Kft. képviselt cégei



Formulation termékpalettája



Rheolaser



Curinscan



Fluidicam



Turbiscan család

Bevonatok és funkcionális filmek



**Technical
paints & inks**



**Powder
coatings**



Adhesives



Cosmetics



Elastomers

Formulálás kihívásai



Environment – *Transition form solvent base*

Low VOC, Low carbon Footprint, bio-based formulation, legislation constraint, ...



Innovation - *New insights*

Conductive prop., mechanical prop., specific treatment, ...



Competition

Cheaper, faster and easier to use



Igények és lehetőségek

Need for Innovative formulation & Process optimization:



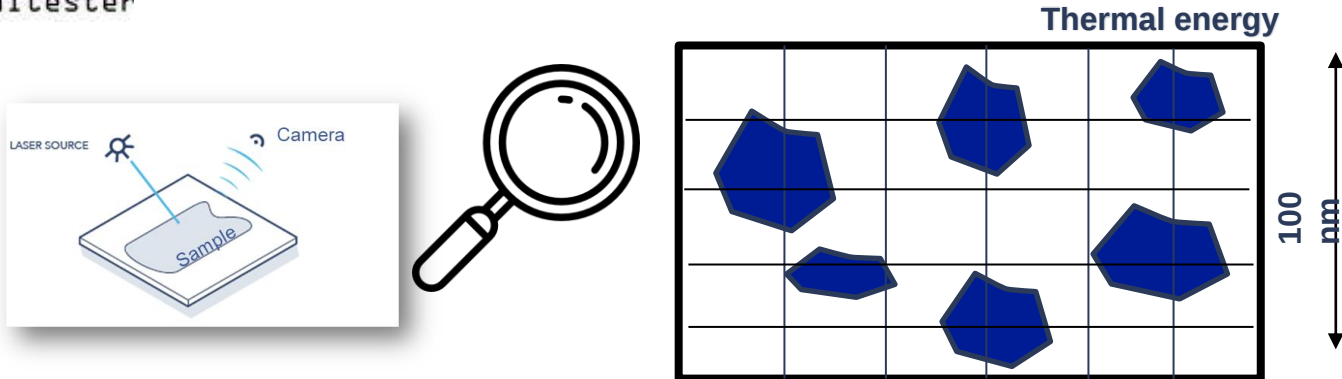
1- Impact of the formulation ingredients & conditions :
Temperature, humidity, substrate, thickness

2- Precise knowledge & understanding of formulation:
Curing time, Curing steps & Characteristic times
Open time, surface dry, dry-through...

3- Protocol optimization : *Time & Temperature*



NMA: Nanoscale Mobility Analysis



Structures (particles, aggregates, etc.)
dispersed in a continuous phase (matrix)

10^{-9} m

Nanometer sensitivity
High acquisition frequency



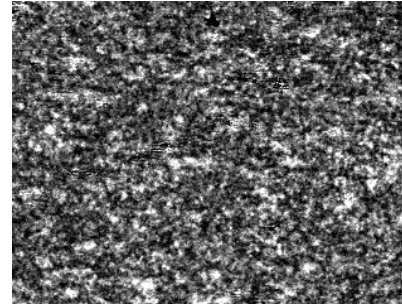
BENEFIT

Very high sensitivity of structures
(particles, aggregates, etc.)
mobility at the nanometer scale
over a large time range



Laser

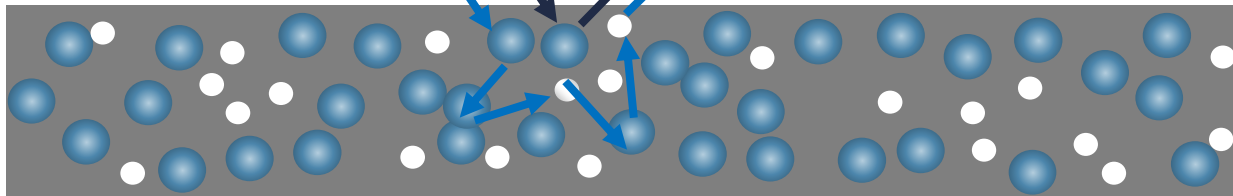
SPECKLE image



Camera



Backscattered waves

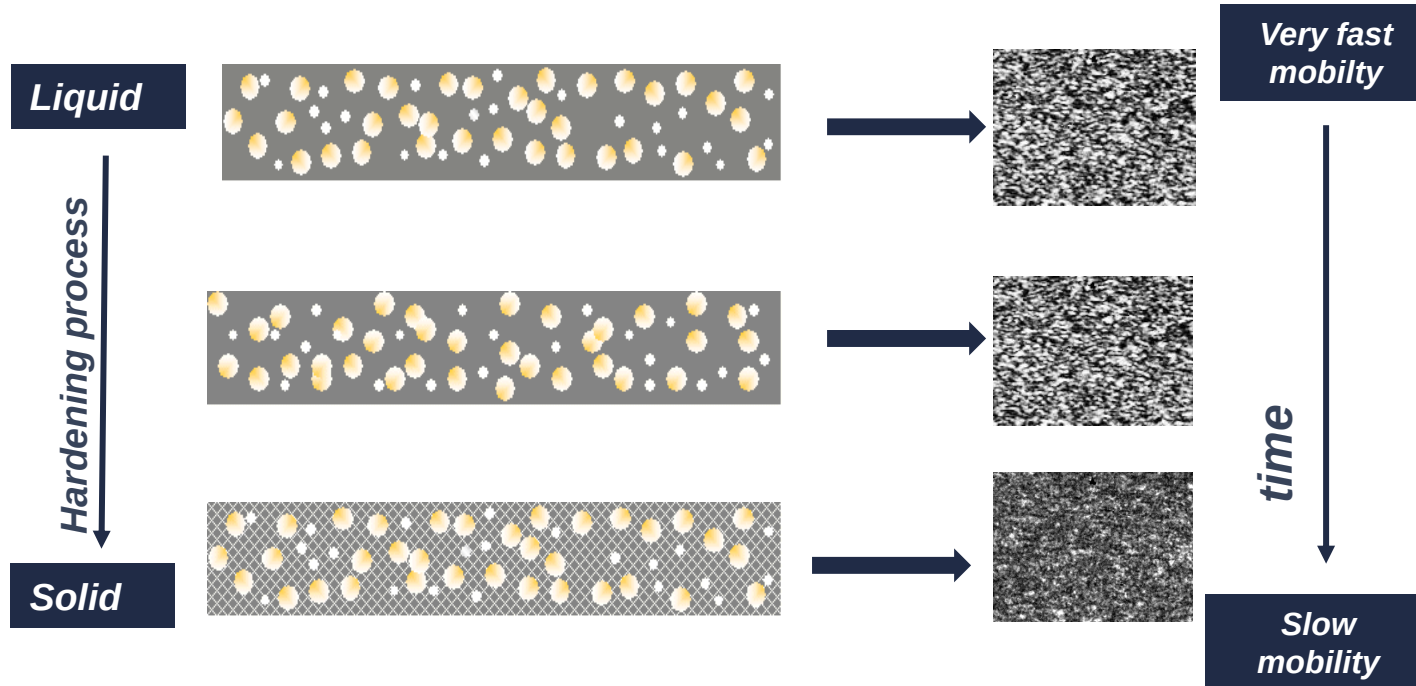


Scatterers = particles, droplets, fibers ...



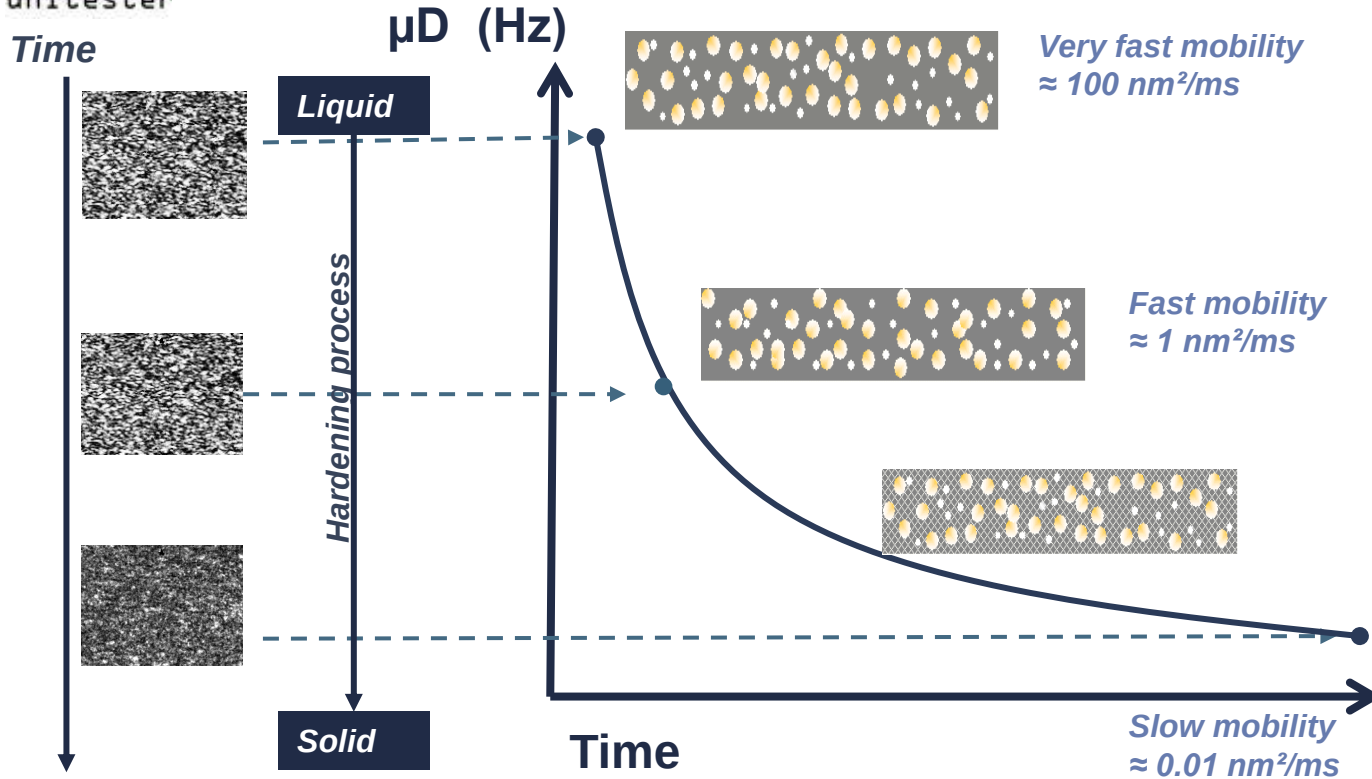
Scatterers brownian motion

**SPECKLE image is
fluctuating**



Fluctuation speed is correlated to the material structure

NMA, Mérés elv



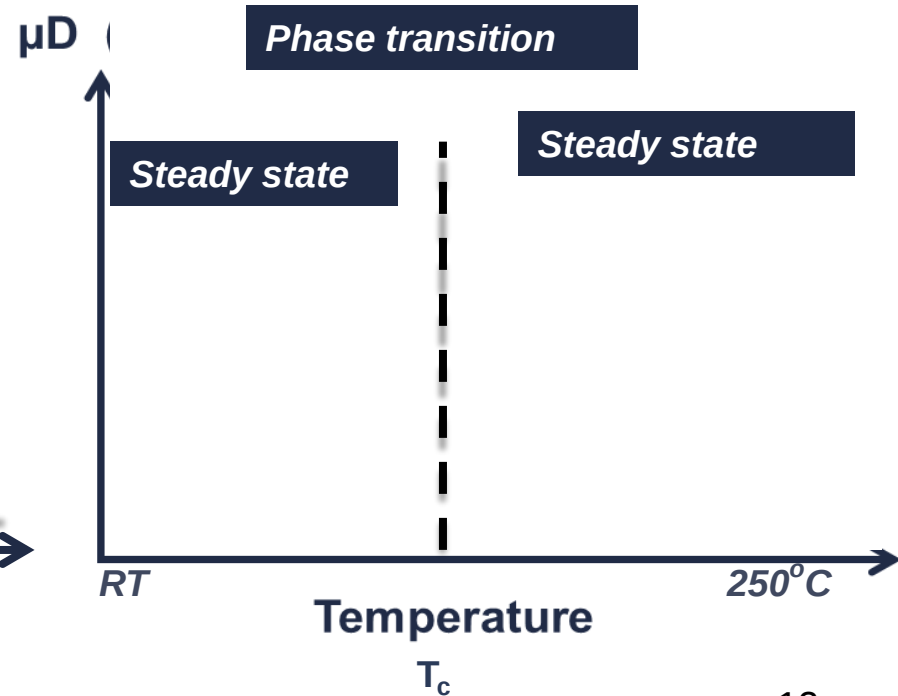
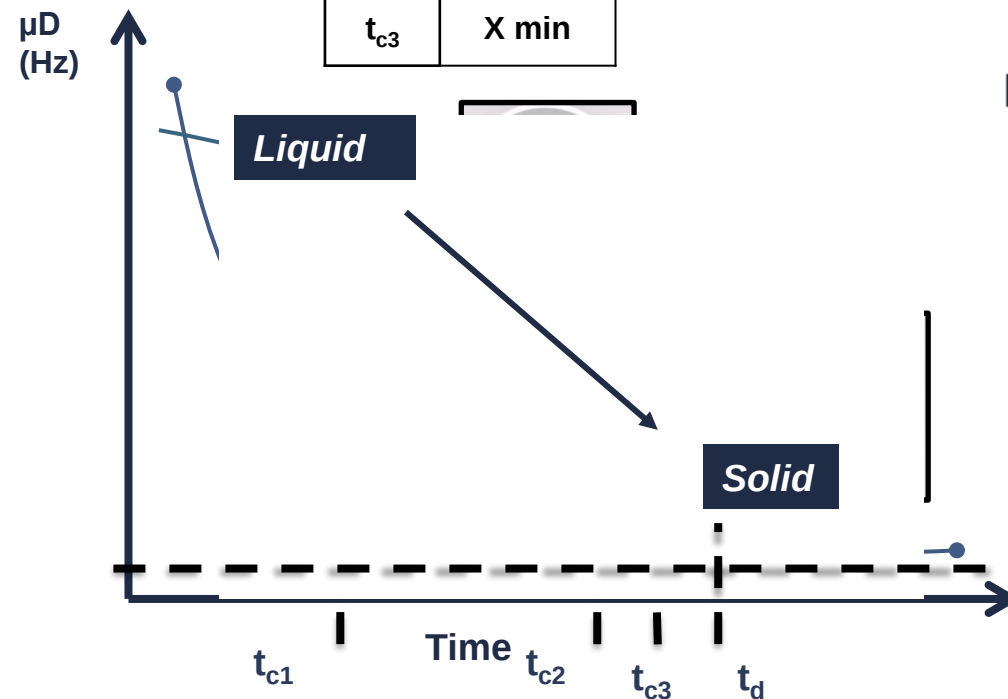
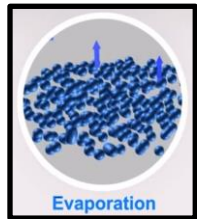
μD allows to monitor curing & drying kinetics

NMA, mérések információtartalma

- 1- Drying time: Temperature, humidity, substrate, thickness...
- 2- Drying steps & characteristic times
- 3- Transition temperature

→ Optimization curing/drying protocol

t_c at XX°C XXX μ m thick	
t_{c1}	X min
t_{c2}	X min
t_{c3}	X min





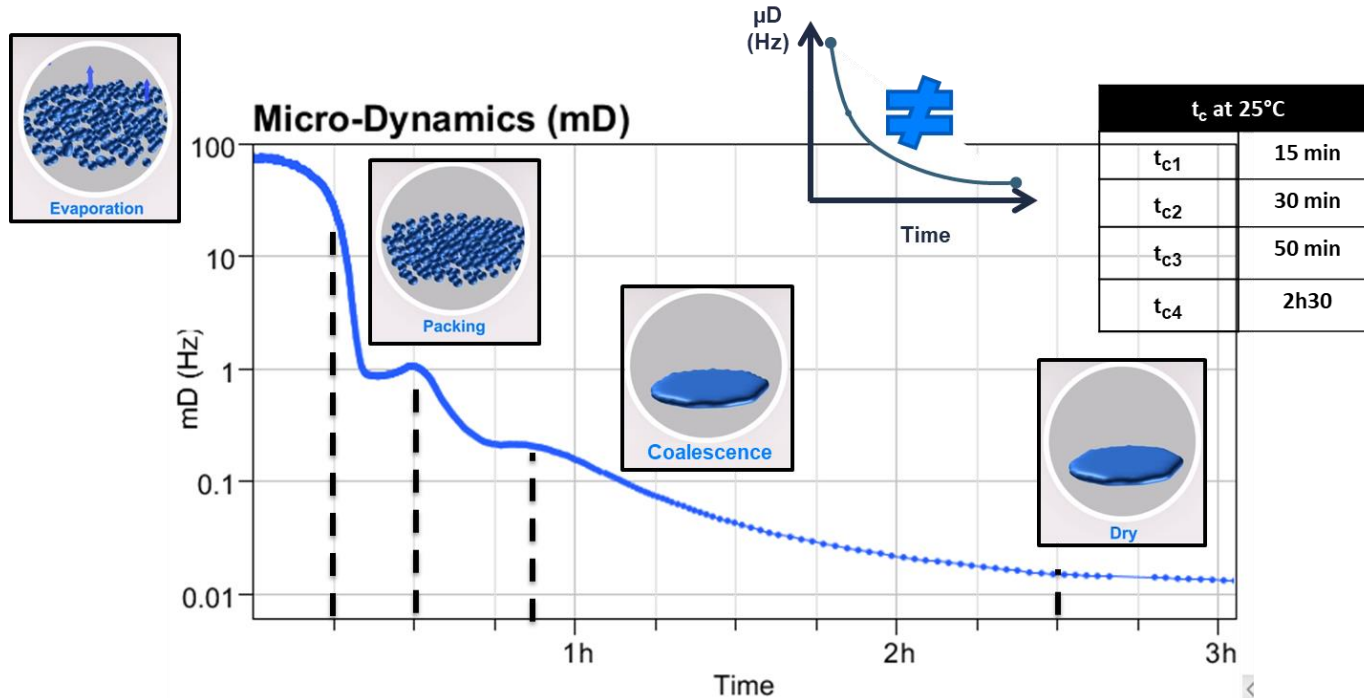
In-situ & contactless measurement
Sensitivity to nm mobility
Surface & bulk measurement
Handy sampling and experiment launching

Objectivity and accuracy to monitor the curing/drying (steps, times...)
Possibility to analyse on any substrate
Temperature & humidity control



Alaklamazási területek

Folyadék bevonatok száradása

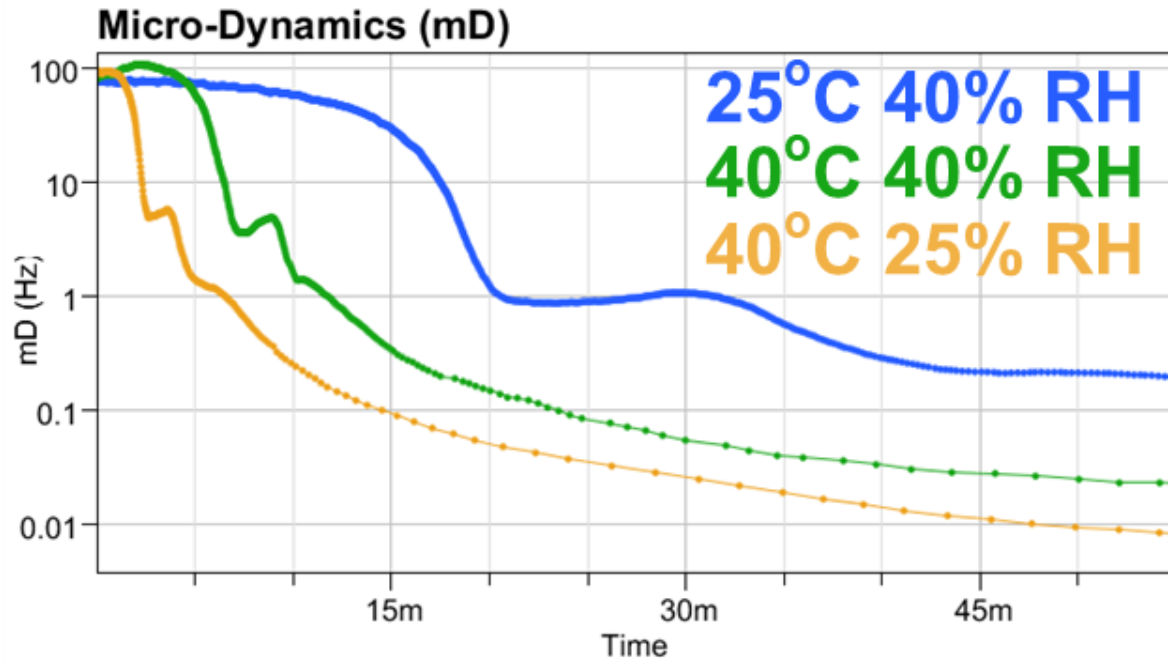


Monitoring the curing/drying kinetics and Determine the characteristic steps & times

➔ Optimal formulation & curing protocol

Alaklamazási területek

Folyadék bevonatok száradása



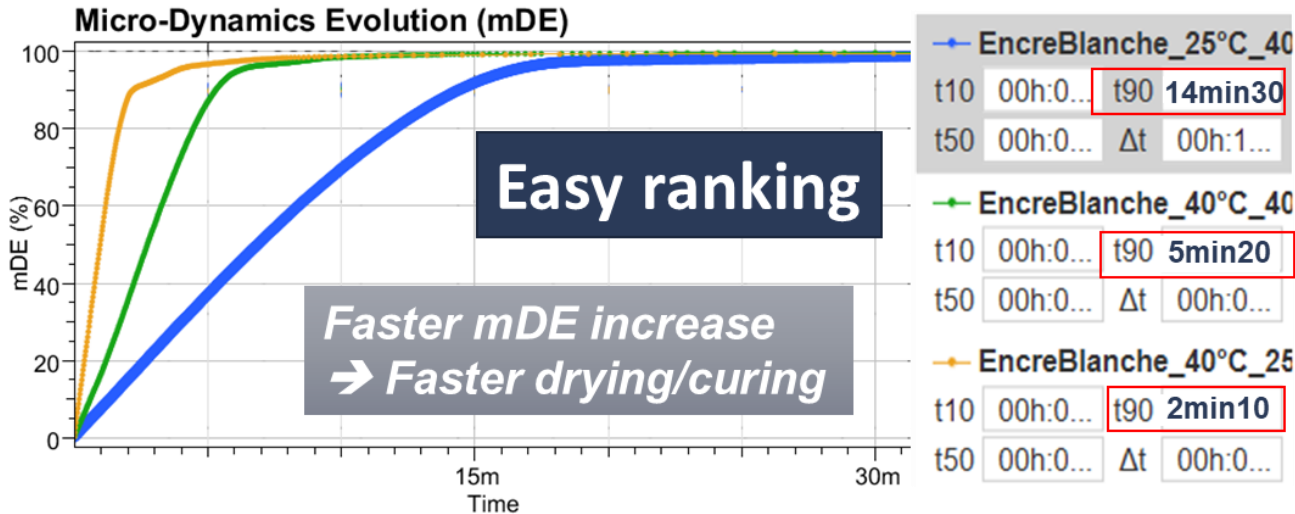
Understand the influence of the temperature,
humidity or the substrate

➔ **Mimic the realistic condition**



Alaklamazási területek

Folyadék bevonatok száradása



Quantitative information

t90≈Open time

Compare different formulations & conditions

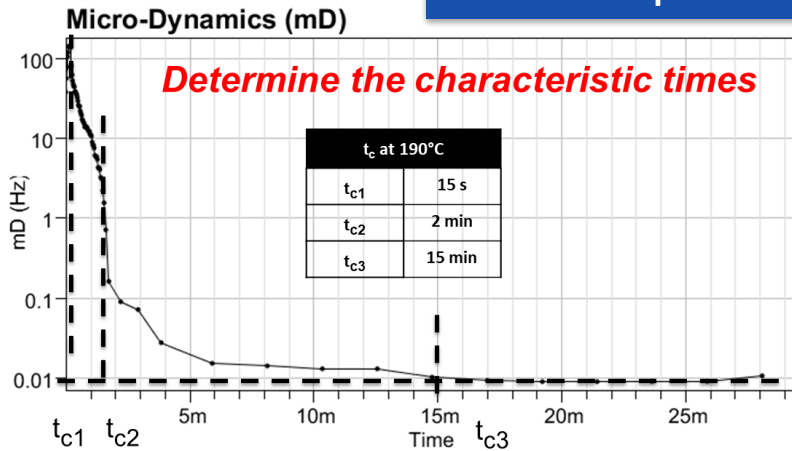
→ Quantitative information



Alaklamazási területek

Komplex polimerek száradása - porfestés

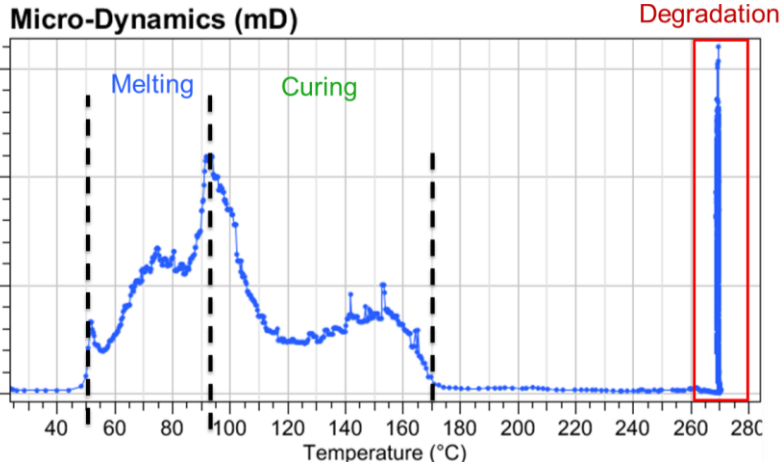
Constant temperature (190°C)



Needs:

Determine the optimal curing protocol
Identify characteristic temperature
Compare different formulations & protocol

Optimal curing protocol



Increasing temperature
(RT → 270°C)

Identify different curing steps & the degradation

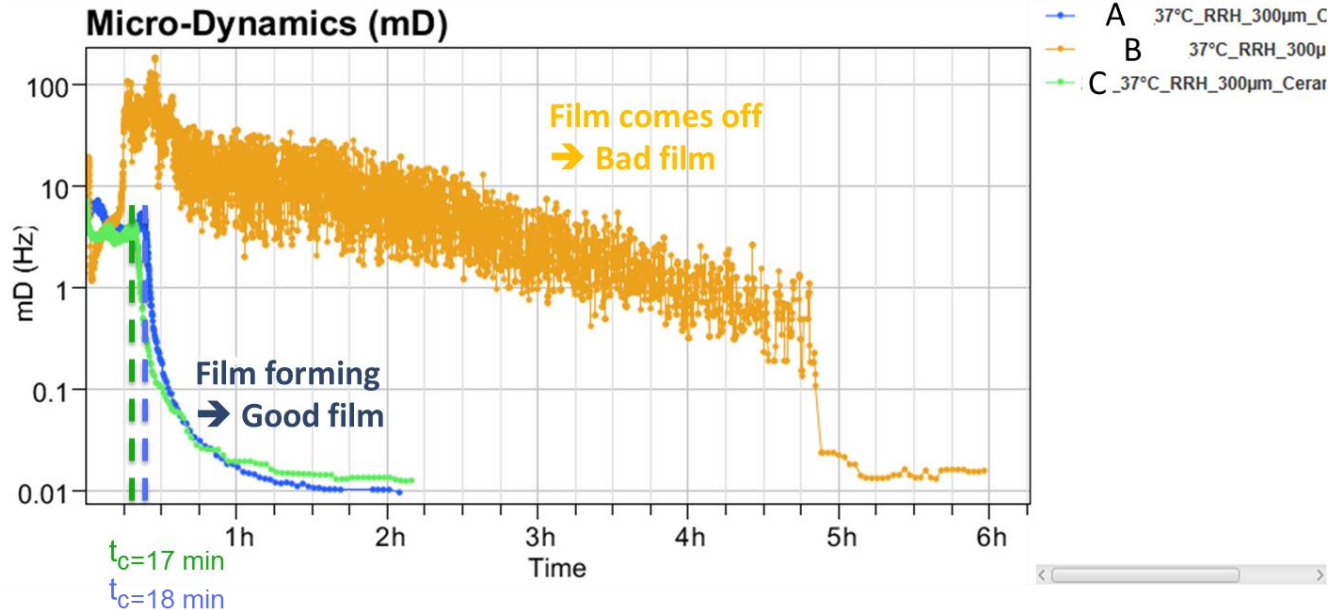


Alaklamazási területek

Kozmetikai ipar - arcmaszk

Needs:

Determine the optimal time to remove the mask
Test under realistic conditions
Compare different formulations



Determine the characteristic times

→ Optimal time to remove the mask



Alaklamazási területek

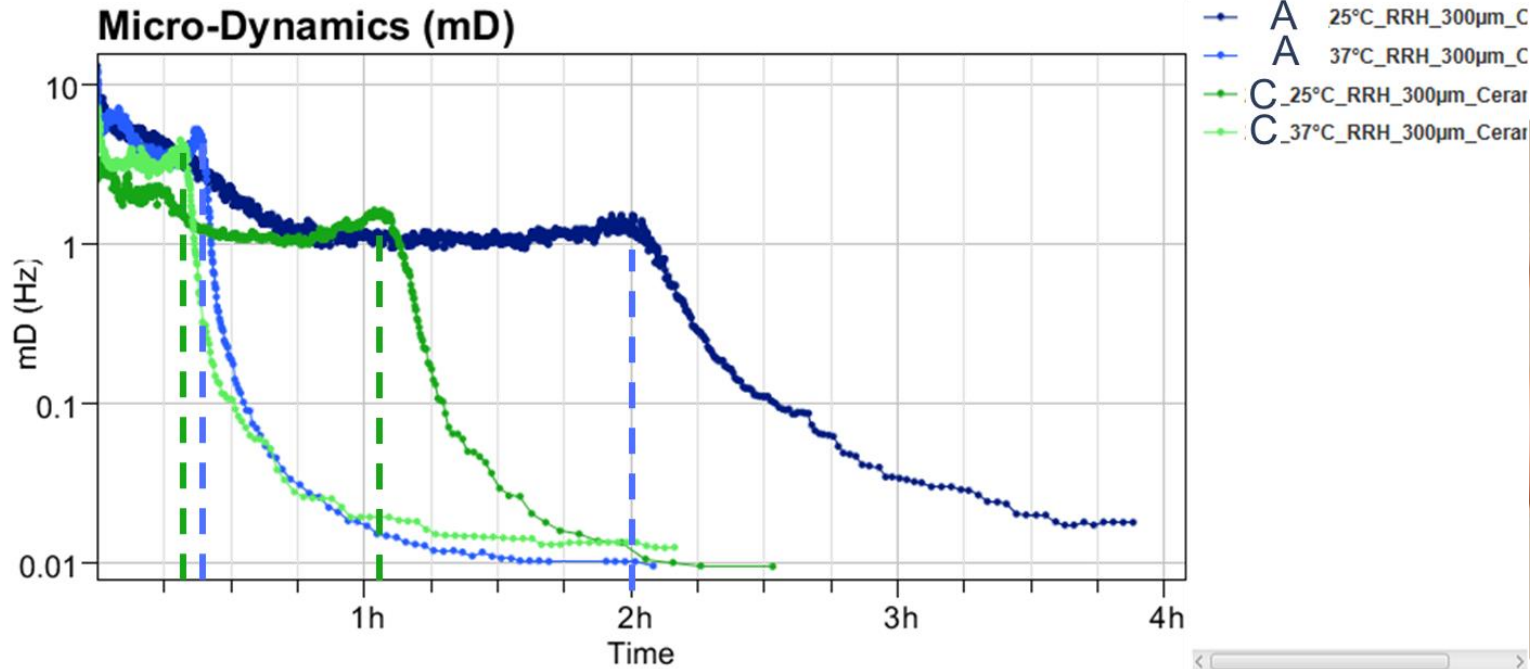
Kozmetikai ipar - arcmaszk

Needs:

Determine the optimal time to remove the mask

Test under realistic conditions

Compare different formulations



Understand the influence of the temperature, humidity or the substrate

➔ Realistic conditions



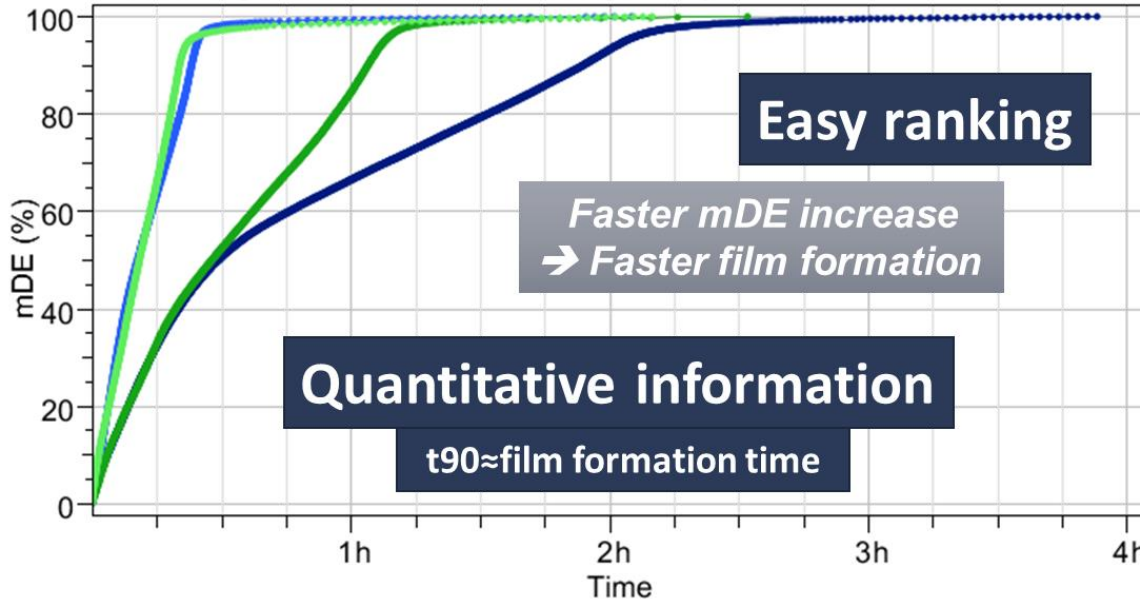
Alaklamazási területek

Kozmetikai ipar - arcmaszk

Needs:

Determine the optimal time to remove the mask
Test under realistic conditions
Compare different formulations

Micro-Dynamics Evolution (mDE)



A_25°C_RRH_300µm			
t10	00h:03m	t90	01h:53m
t50	00h:40m	Δt	01h:50m
A_37°C_RRH_300µm			
t10	00h:01m	t90	00h:23m
t50	00h:11m	Δt	00h:21m
C_25°C_RRH_300µm_Cel			
t10	00h:03m	t90	01h:04m
t50	00h:30m	Δt	01h:00m
C_37°C_RRH_300µm_Cel			
t10	00h:01m	t90	00h:20m



Compare different formulations

→ "Good" / "Bad" film

→ Fast/slow film formation



Elérhetőségeink

Termékinformáció, webinár:

www.formulaction.com

Ajánlatkérés, bemutató mérés:

info@unitester.hu

Köszönöm a figyelmet!