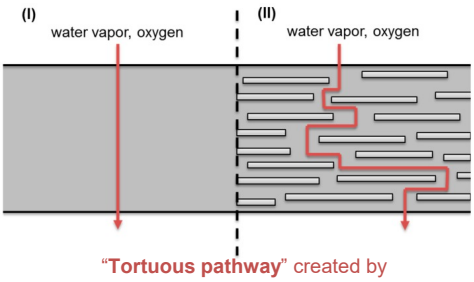
Poster 9-4

Improved properties of films and coatings by nano-modification

MOTIVATION

✓ Whey protein isolate (WPI) based coatings are promising EVOH substitutes:

- Excellent barrier properties
- Improvement of recyclability of multilayer polymer films
- Development of full techno-functional properties through denaturation!
- Further improvement by incorporation of nanoparticles

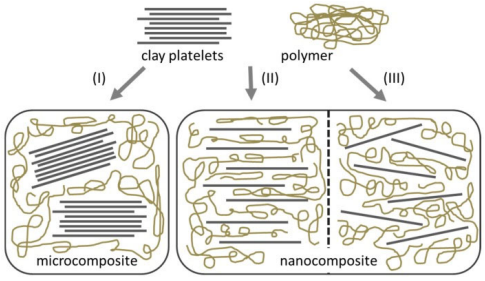


"**Tortuous pathway**" created by incorporation of exfoliated clay **nanoplatelets** into a polymer matrix film

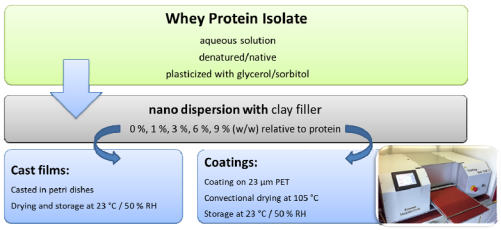
TARGET

✓ Development of nano-enhanced whey formulations:

- Nano dispersion with clay filler
- WPI (denatured/native) plasticized with glycerol/sorbitol



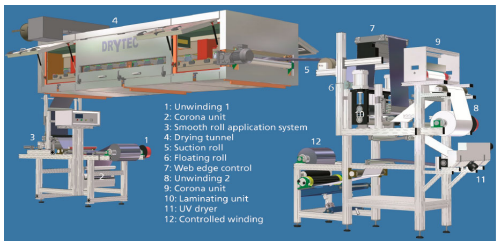
MATERIALS & METHODS



✓ Oxygen permeation: DIN 53380-3 (23°C, 50% RH)

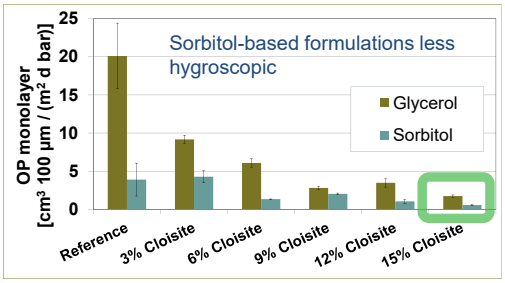
✓ Scanning Electron Microscopy (SEM) JSM-7200F (JEOL Ltd.). Ar^+-ion beam milling using a cross-section polisher IB-19530CP.

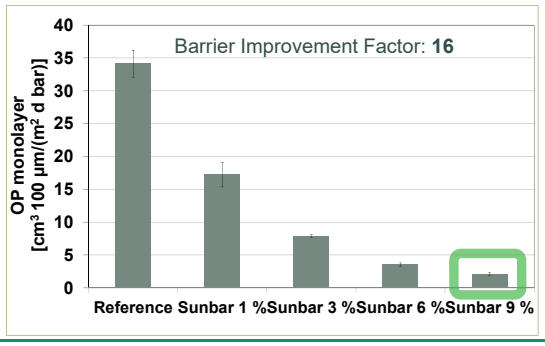
✓ ***Fraunhofer pilot plant coating unit***



RESULTS

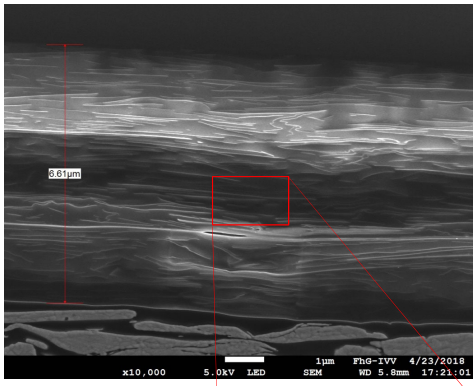
OXYGEN PERMEABILITY (OP)

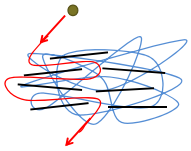


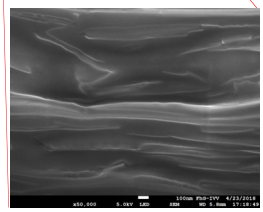


RESULTS

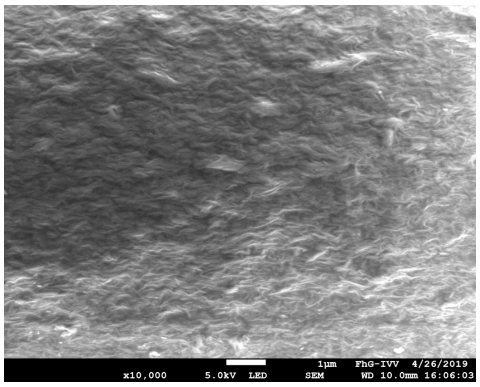
ORIENTATION OF NANOPLATELETS

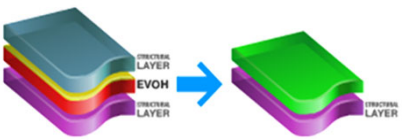






Tortuosity effect maximised by optimal dispersion and orientation





OPTINANOPRO

This project has received funding from the European Union's Horizon 2020 research and innovation program under grant 686116. Project Coordinator: Elodie Bugnicourt, IRIS Technology Solutions, Spain

www.optinanopro.eu

Contact person: Esra Kucukpinar
esra.kucukpinar@ivv.fraunhofer.de

Fraunhofer IVV