

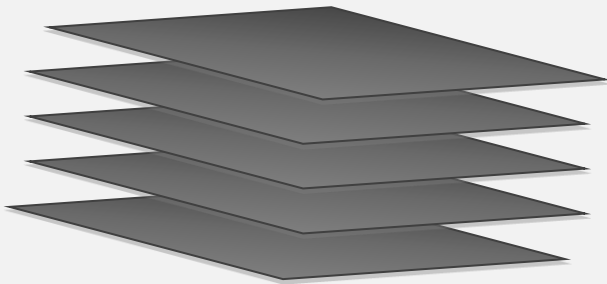


Nanoclays
Biopolymers and extracts
Material Science

- About us
- Engineered clay technology
- Commercial Structure
- International Expansion Strategy

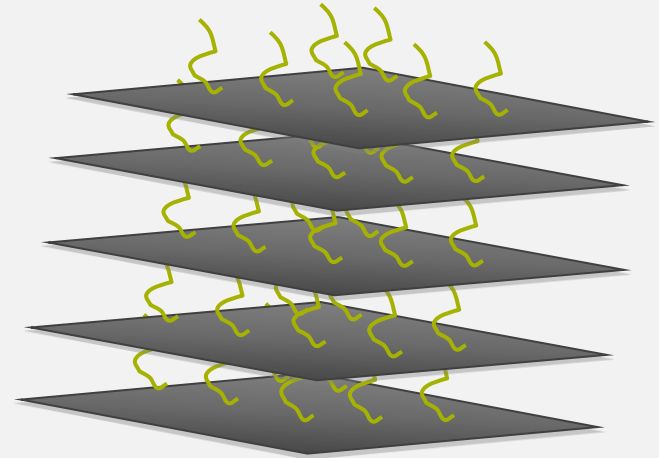
Clay Purification & Modification

Purified Mineral:
Natural clay tactoid (stack)



Surface
Modification

Modified Clay

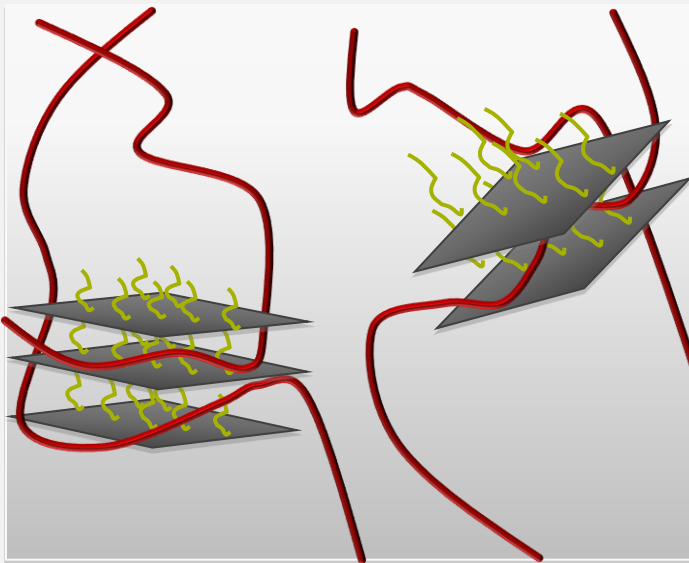


Nanoclay Platelet

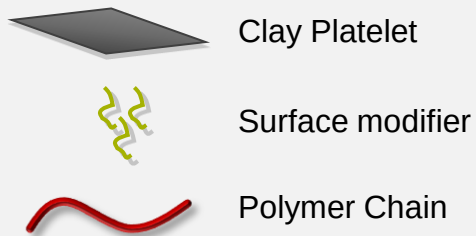
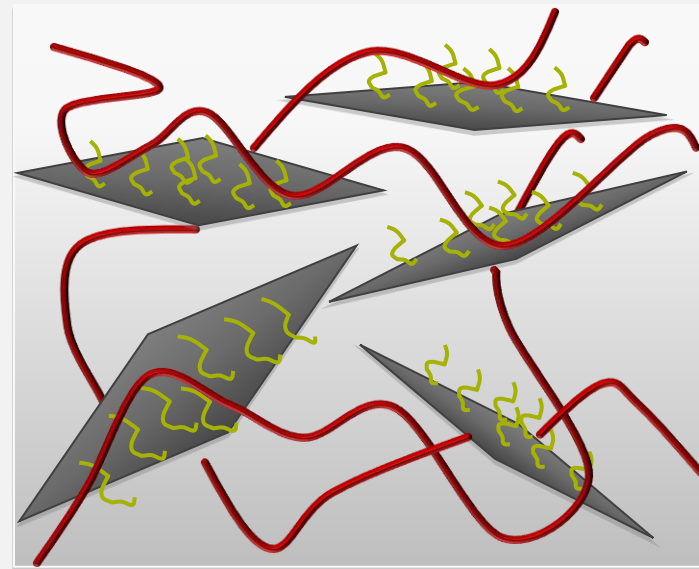


Surface modifier

Intercalated Engineered Clay



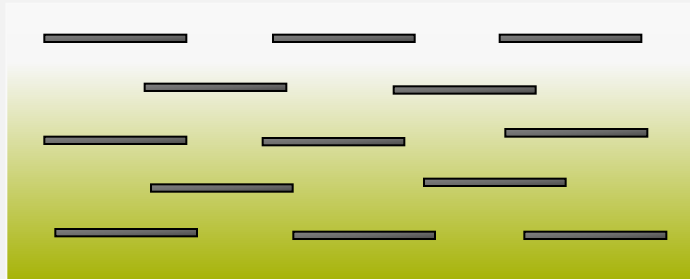
Exfoliated Nanoclay



- The exfoliated clay within in polymer matrix is only nanoscale in 1 dimension (Thickness 20-50nm).
- The individual clay platelets are never present as a freely in the powder and as such there is not direct exposure to nanotechnology

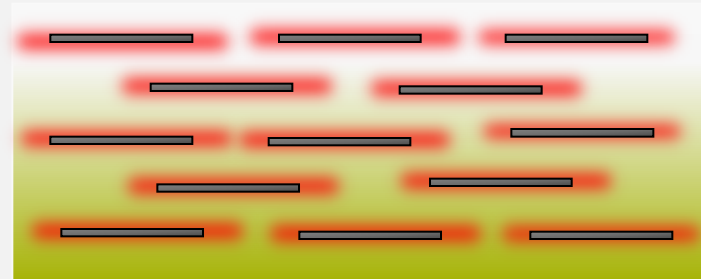
Standard Clay Vs. Engineered Clay

Physical Properties Clay only



- Barrier Properties (Often Nanoclay)
- Mech. & Rheo. Properties
- Foaming

Active Properties Clay + Functionalization



- Antimicrobial (silver)
- Oxygen Scavengers (Iron)
- Antioxidant (Natural extract)

“NanoBioMatters has the technology to create nano-dispersed clays, but this is often not practical or necessary for functionalized clays.”



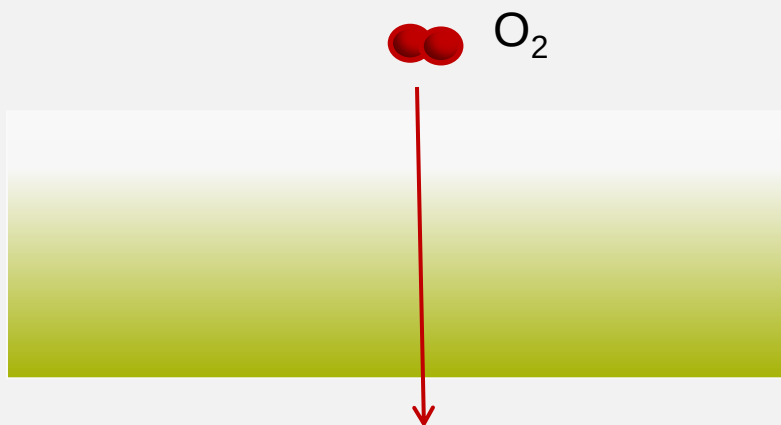
o2BLOCK



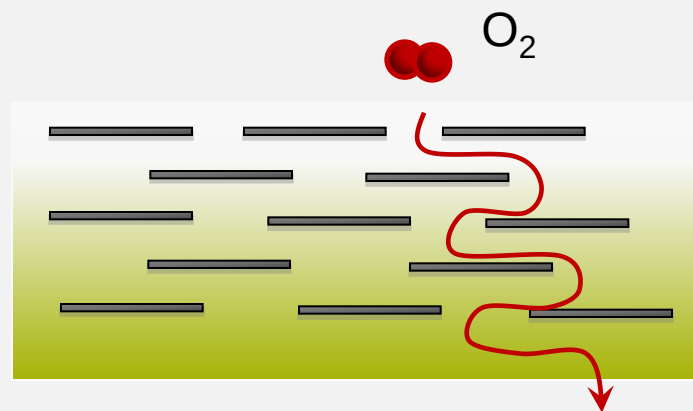
O₂BLOCK

Tortuous Path Principle: Passive Barrier Enhancement

Without O₂Block®

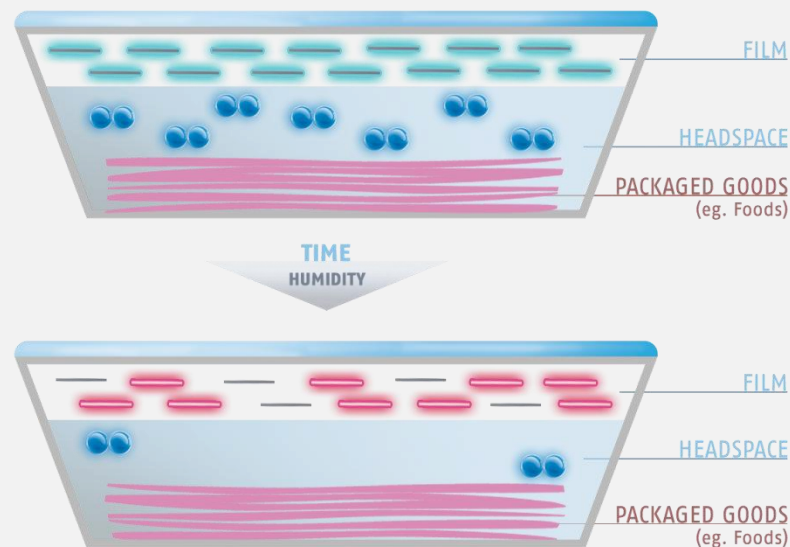
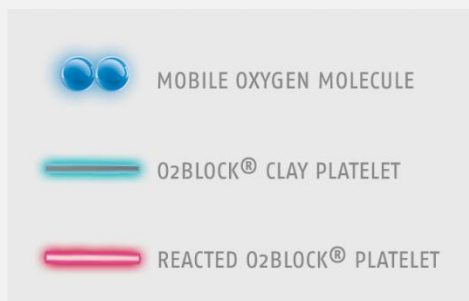


With O₂Block®



EVOH barrier improvement up to 50%

O2BLOCK

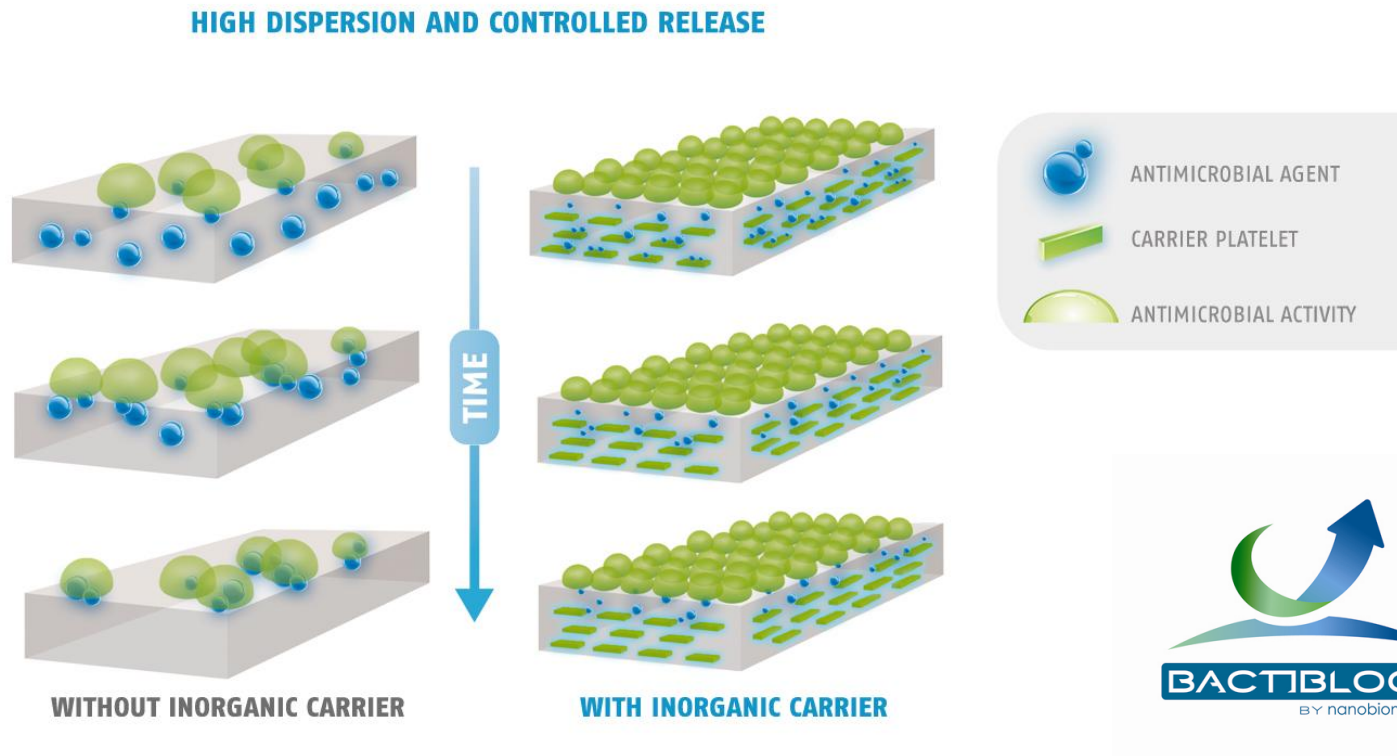


✓ Dispersion directly in the packaging material film/tray). Initial tests indicate better kinetics and efficiency than standard iron based additives due to high dispersion



✓ No need for additional Activation equipment. Humidity activated.





 Higher efficiency than standard antimicrobial additives due to high dispersion

 Durability is ensured through permanent modification or controlled release mechanisms.

Antimicrobial Applications



Healthcare & Medical



Building & Construction



Furniture & Office
Accessories



Food Packaging



Shoes & Apparel

Medium Sized International Business



Commercial Additive Plant - Vall D'Uixo, Spain
Capacity 2,500t/year (~ 50,000-150,000t resin/year)



Commercial extrusion plant – Valencia, Spain
Capacity 4000t/year



Pilot Plants and Laboratory – Valencia, Spain
Nanotechnology, plastics compounding, microbiology, barrier properties, food contact testing, thermal and mechanical plastics properties (O2TR, WVTR, WAXS, TGA, DSC, UV-IR, etc.)



Commercial offices: Spain (Valencia), Japan (Tokyo) and USA (Boston)

1. Identify suitable distributors, local agents and consultants.
2. Collaboration with national and global **Research Centers:**



3. **Subsidiaries** in key markets:

NanoBioMatters **North America** (Boston)

NanoBioMatters **Japan** (Tokyo)



4. **Institutional support** allows to initiate activity in strategic markets:



...with this support NBM participates in **International Exhibitions** :

Nanotech Taiwan

Nanotech Japan

Rusnanotech

Thank you for your attention...

- Tomorrows Technologies, Combined Today

Nanoclays

Biopolymers and extracts

Material Science