The Company

NanoBioMatters is a material science company specialized in engineered clay-based additives.

Our mission is to create additives that maximize the performance of materials through unique, sustainable and cost effective clay dispersion and functionalization technology.

NanoBioMatters proprietary technology is based on naturally sourced clays, which are refined, purified and surface modified to ensure uniform dispersion and compatibility with a variety of polymer systems. The modification technology includes the addition of active functionalities and the creation of novel and highly efficient products, such as antimicrobial or antioxidant additives.

The major advantage of working with highly dispersed clay additives compared to traditional additives is that it enables the enhancement of specific target properties without compromising the inherently positive properties of the original material.

NanoBioMatters production facilities have a 2500 metric ton/year additive capacity and 4000 metric ton/year master batch capacity supported by state-of-the-art laboratories for analysis and development of clay based additives in plastics.

Product Description

The presence of oxygen is one of the main factors involved in food deterioration; therefore, there is a need to use high barrier materials such as multilayer structures containing Soarnol® EVOH to extend shelf-life and freshness of packaged products. However, for certain applications even further enhanced barrier is still desired, while maintaining transparency, flexibility and recyclability of the packaging materials.

NanoBioMatters has developed a specific O2Block® grade to significantly enhance barrier properties of Soarnol® EVOH, while sustaining minimum impact on processing, optical performance and cost.

O2Block® acts as a barrier not only to oxygen but also to other gases involved in the modified atmosphere packaging such as nitrogen or CO2. It also prevents aroma and flavors from leaving the packaging, thus helping the food to preserve its original properties.

How does Barrier O2Block® work?

The presence of well dispersed high shape factor additives creates a tortuous path that reduces the permeation rate through the material. Using the same additive loading percentage, O2Block® presents a higher number of plates acting as obstacles to the penetration of vapors through the film while presenting an excellent adhesion to the polymer.

This schematic model for explaining the barrier effect is a simplified description of the functionality, factors such as filling of free volume and reduced solubility around the clay platelets also play an important role in the barrier properties.

As it can be observed in the graphs, O2Block® allows reduction of oxygen transmission, including at high humidity, usual condition in food packaging applications. The results show that barrier performance can be doubled even at 90% relative humidity by adding 6% of O2Block® within a 5 micron Soarnol® EVOH layer.
It is also important to note that O2Block® does not only increase oxygen barrier but also enhances UV barrier. The synergistic UV blocking of O2Block® can also help prevent food deterioration and extend product quality and safety.

Barrier O2Block® Differentiation

The O2Block® performance and unique position in the market are based on the following factors:

- Selection of the adequate phyllosilicate source, aspect ratio, purification process and physical and surface treatment control to ensure maximum barrier improvement.

- Masterbatch production through customized patented processes to maximize dispersion of the engineered clay into the Soarnol® EVOH matrix.

- Soarnol® EVOH masterbatch containing O2Block® is in compliance with FDA legislation and the EU Directives for food contact applications.

- Masterbatches can be supplied in any specific Soarnol® EVOH grades as indicated by the final clients.

- O2Block® masterbatches are completely safe to handle. The engineered clay which is already dispersed in the polymer matrix presents only 10 (thickness) in the nanoscale.

TEM Picture showing NanoBioTer dispersion in a Soarnol® EVOH matrix.

Barrier O2Block® Applications

Up to 70% of the barrier applications are focused on the food packaging market, including food such as red meat, fish, cheese, fresh pasta, etc., beverages, sauces, pet food and produce, among others.

O2Block® Soarnol® EVOH concentrate can be used in most of the manufacturing processes involved in the processing of all types of structures used in flexible or rigid packaging:

- Cast film and sheet coextrusion
- Blown film coextrusion
- Injection molding
- Coextrusion blow molding
- Coatings

It also allows conversion processes of coextruded sheets, such as thermoforming for trays and cups production.

In certain applications, the use of O2Block® not only improves the barrier but also allow down-gauging (when Soarnol® EVOH thicknesses above 20 microns are used). This leads to direct cost savings and increased sustainability due to the decrease of weight per packaging unit. A part from food industries, there are several market segments where barrier to oxygen and other gases is also critical. Interesting applications can be found in markets such as cosmetics, industrial containers and construction among others.