

# DISPERSION OF NANOCCLAY AND ITS EFFECT ON GAS PERMEABILITY IN POLYMERS

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Aim of the reported work is to develop an easy and cost-effective technology for gas barrier enhancement by incorporating nanoclay in industrially relevant packaging polymers. Nanoclay consists of AlO<sub>2</sub> and SiO<sub>2</sub> platelets with a thickness of ca 1nm and a diameter of ca 200nm. These platelets are normally agglomerated into bigger clusters, but when exfoliated, they have been reported to improve the gas barrier of a polymer up to 2-3 times by creating a tortuous path for gas molecules and increasing the diffusion length. [1] By using this method, the oxygen barrier of EVOH-films has been increased by an order of magnitude even in high relative humidity (> 80%). [2]. The primary objective of present report is to assess the applicability of polymer hot-melt technique and more specifically hot-pressing and compounder technology for achieving satisfactory exfoliation, orientation and dispersion of nanoclay platelets inside different polymer (including polyamide and EVOH) films to achieve measureable gas barrier changes in them. Results of the first experiments are reported.

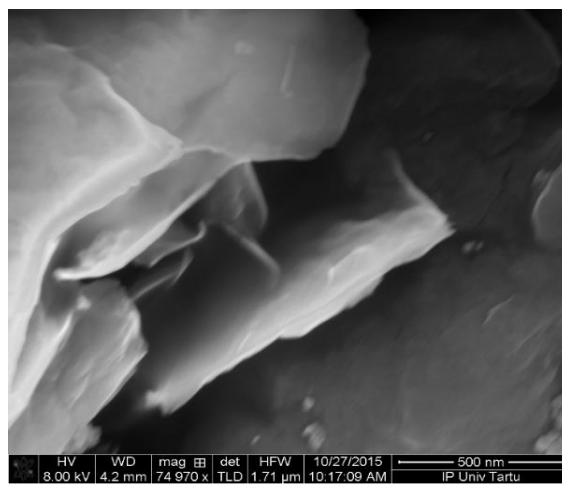


Fig.1 Nanoclay platelets.

## References

1. Kim, Seong Woo, and Sang-Ho Cha. "Thermal, Mechanical, and Gas Barrier Properties of Ethylene-Vinyl Alcohol Copolymer-Based Nanocomposites for Food Packaging Films: Effects of Nanoclay Loading." *Journal of Applied Polymer Science* 131, no. 11 (June 5, 2014)
2. Cerisuelo, Josep Pasqual, José Alonso, Susana Aucejo, Rafael Gavara, and Pilar Hernández-Muñoz. "Modifications Induced by the Addition of a Nanoclay in the Functional and Active Properties of an EVOH Film Containing Carvacrol for Food Packaging." *Journal of Membrane Science* 423–24 (December 15, 2012): 247–56.



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