Prolabin&Tefarm
Polymer Additives, Cosmetic Ingredients, Catalysts

Nanotechnology to improve properties and performances of thermoplastic and thermosetting polymers and biopolymers

The realization of polymeric nanocomposites

allows the great improvement of the mechanical, thermal and barrier properties of polymers with small percentages of additive.

PT-Clay additives are the result of the technological transfer of 30 years of academic research and the collaboration with the best international excellence centres and end-user companies, leader in strategic application fields. They offer effective solutions to modern technological and environmental challenges.

Polymer additives catalogue

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PT-Clay products are optimized for the different polymers and on the base of parameters such as processability and capability of the additive to homogenously exfoliate/disperse into the polymer of interest.

PT-Clay additives due to the different nature of the interlayer organic modifier are compatible and suitable for a large variety of polymers and copolymers. The biocompatibility of the materials does not modify indeed it often improves the recyclability or biodegradability characteristics of the polymeric matrices.

Selected PT-Clay products can be provided in formulation with other synergic fillers and are proposed for special applications.

Functionalized clays specially advised for the dispersion in a suitable polymer												
Product	PE	PP	PVC	EVA	PU	PA	PLA	PET	EPOXY	ACRYL	PS/ABS	WPC
PT-Clay 100	√	√	√		√							√
PT-Clay 200	√	√	√		√							√
PT-Clay 307	√	√	√	√	√				√	√		√
PT-Clay 311	√	√	√	√	√				√	√		√
PT-Clay 313	√											
PT-Clay 317	√	√	√				√	√				
PT-Clay 331	√						√				√	
PT-Clay 337	√										√	
PT-Clay 409	√					√	√	√				
PT-Clay 419	√	√	√	√	√	√	√	√	√	√	√	√
PT-Clay 421									√	√		√
PT-Clay 439										√		

PE: Polyethylene, PP: homo/copo/random Polypropylene, PVC: PolyVinyl Chloride, EVA: Ethylene-Vinyl Acetate, PU: Polyurethanes, PA: Polyamide, PLA: Poly-Lactic Acid, PET: polyethylene Terephthalate, EPOXY: epoxy resins, ACRYL: acrylic resins, PS: Polystyrenes, ABS: Acrylonitrile Butadiene Styrene, WPC: Wood Plastic Composite.

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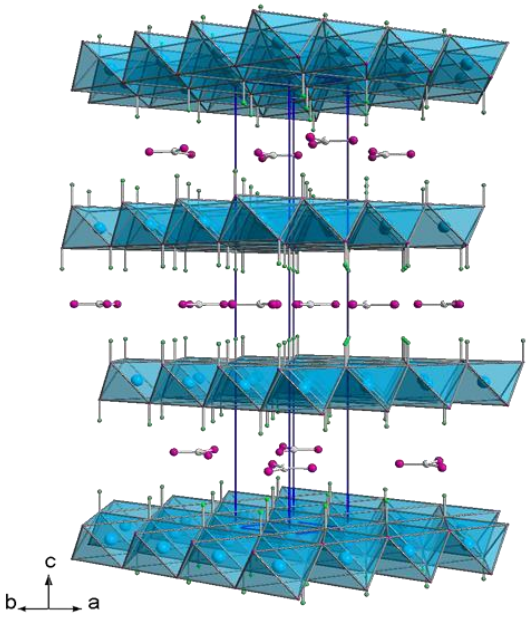
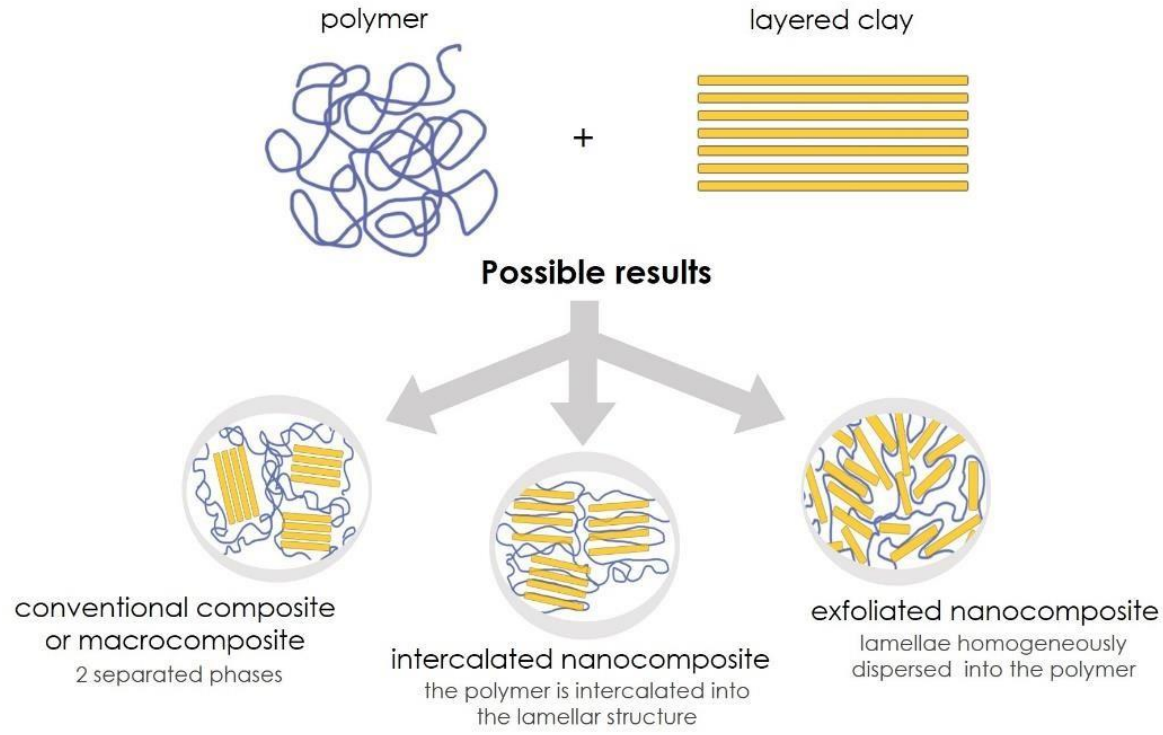
Prolabin & Tefarm provides additives based on functionalized **layered hydrotalcites** and **zirconium phosphates** able to improve the mechanical, thermal, barrier and biodegradability properties of various thermoplastic and thermosetting polymers.



A **nanocomposite** is a multiphase material made up of at least two components, one of which is dispersed in the other at nanometric level (10^{-9} m). The dispersion of a low amount of inorganic particles (up to 5% by weight in organic polymers) produces new composite materials with improved **mechanical**, gas and liquid **barrier**, **flame retardant properties** and chemical stability, if compared to the neat polymer. The exfoliated structure presents the maximum interaction between polymer and lamellae and it produces the maximum effect on the properties of the final nanocomposite.



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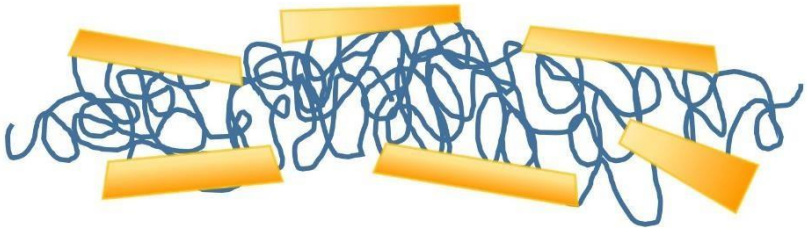
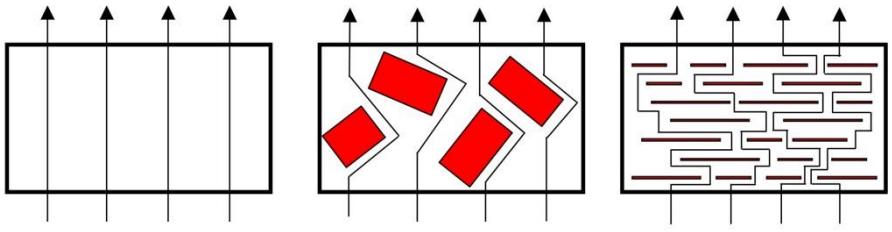
The interaction between the polymer chains and the lamellae dispersed in the composite produces a significant improvement in the mechanical properties. The high aspect ratio of P&T additives gives greater hardness, tensile, compression and flexion strength to the plastic composite products.



Composite materials show a considerable increase in the degradation temperature and a flame retardant effect due to the presence of a char layer formed during the combustion. This char layer is an inert and insulating coating which acts as a physical barrier between the polymer and the combustion environment.
The physical barrier limits the oxygen ingress, slows down the combustion and reduces the emission of smoke and volatile combustion products.

Lamellar additives constitute a physical barrier that opposes the permeation of gases and vapours (O_2, CO_2, H_2O, solvents) inside the composite, creating a tortuous path that traps the gas molecules and slows its diffusion (labyrinth effect).



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European projects

Prolabin & Tefarm was and is active partner for the development of polymeric nanocomposites in tollowing EU projects:

FAST
Functionally graded Additive Manufacturing scaffolds by hybrid manufacturing
www.project-fast.eu

PolyCE
www.polyce-project.eu

HIFIVEN
www.hifiventproject.eu

NANOFRABS

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