GRAFT POLYMER

COMBINE INCOMPATIBLE

Polymer modification is a **KEY** to innovative composite materials development.

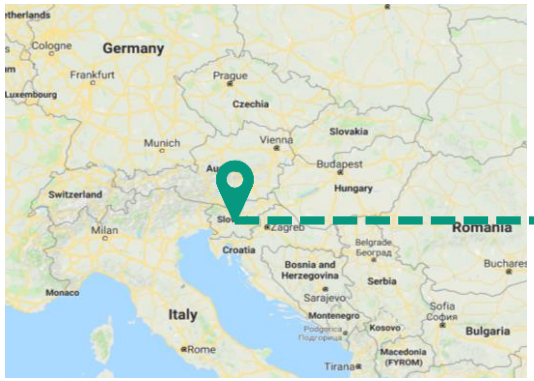
Company Presentation

2019

OVERVIEW

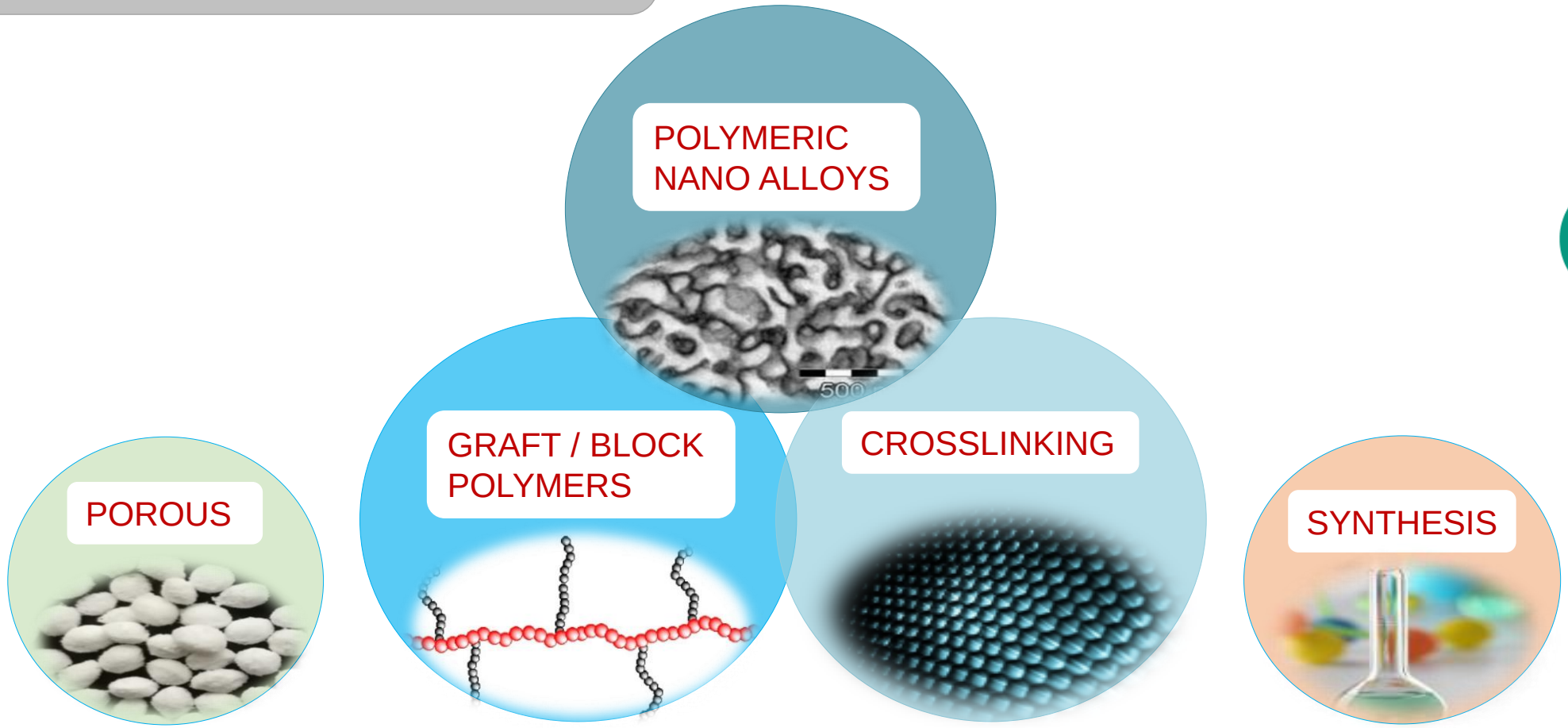
COMPANY HISTORY

- Since 2001, our team has been developing innovative polymer modification technologies with product applications that satisfy very specific market requirements across many polymer fields
- The company has experienced good demand for its products throughout Europe which it can now service through its Slovenian facilities capable of manufacturing and supplying 3500-4000 tons of product per year.



BUSINESS MODEL
"COMBINE INCOMPATIBLE" - TO CREATE NEW POLYMER SOLUTIONS

COMPREHENSIVE - BUSINESS MODEL
Using ALL the most advanced METHODS
in the polymer industry



BUSINESS MODEL
TECHNOLOGIES & BUSINESS FLEXIBILITY

INNOVATIVE - TECHNOLOGIES

- Flow induced crystallization
- Solid Phase Grafting
- Solution Grafting
- Fillers Treatments
- Powders Hybridization
- Reactive extrusion
- Alloying
- Crosslinking
- Hot ozonolysis/plasma modification
- Nitroxide Mediated Polymerization
- Micro/Nano Porous polymer carriers etc.

FLEXIBLE OPERATION

- ✓ CUSTOME MADE products at Request
- ✓ Fast Focusing on HOT MARKET Sectors
- ✓ Fast production SCALE-UP

TECHNOLOGIES - COMPARISON VIEW

TECHNOLOGIES	Slovenia	Israel	Italy	Germany	USA		France	Czech	India	China
Flow induced crystallization	X									
Solid Phase Grafting	X			X						
Solution Grafting	X				X	X	X			X
Fillers Treatments	X									
Powders Hybridization	X						X			
Hot ozonolysis/ plasma mod.	X									
Nitroxide Mediated Polymerization	X						X			
Reactive extrusion	X	X	X	X	X	X	X	X	X	X
Alloying	X	X				X	X		X	
Crosslinking	X					X		X		
Micro/Nano Porous polymer	X									

WHAT MAKES GPO UNIQUE – (GRAFTING)

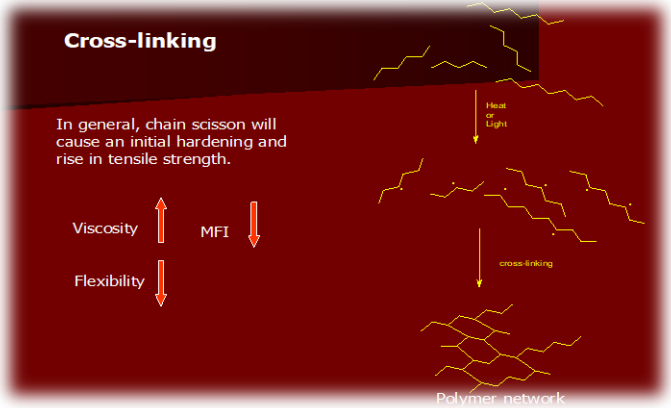
The main global side-effects during the grafting process;

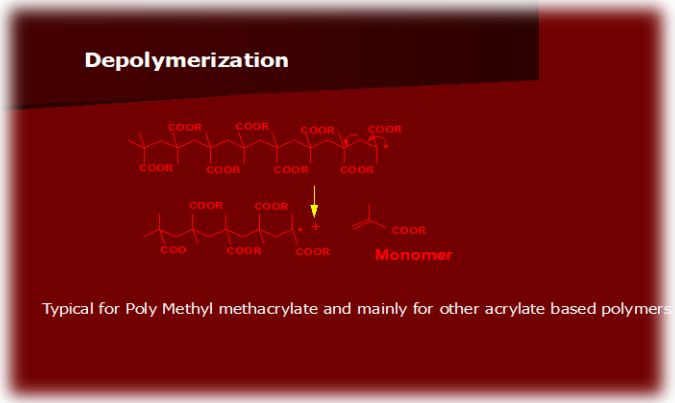
- Crosslinking for ETHYLENE polymers
(Melt Flow Rate of PE usually reduced considerably)
  - For melt grafting up to 10 times
  - For Solid Phase Grafting up to 2-3 times

- Betta-Scission (de-polymerization) for PROPYLENE polymers

- Peroxides usually have very harmful post-residues :
  - Free unreacted peroxides and radicals lead to polymer aging and degradation in time
  - Treat-Butyl Alcohol (TBA) residues restricted in certain application up to 20ppm
  - High Yellowness Index (YI)

- Gel availability exist and influence on:
  - Mechanical Strength and Elongation of final product
  - Film transparency
  - Scotch effects in film and cable processing

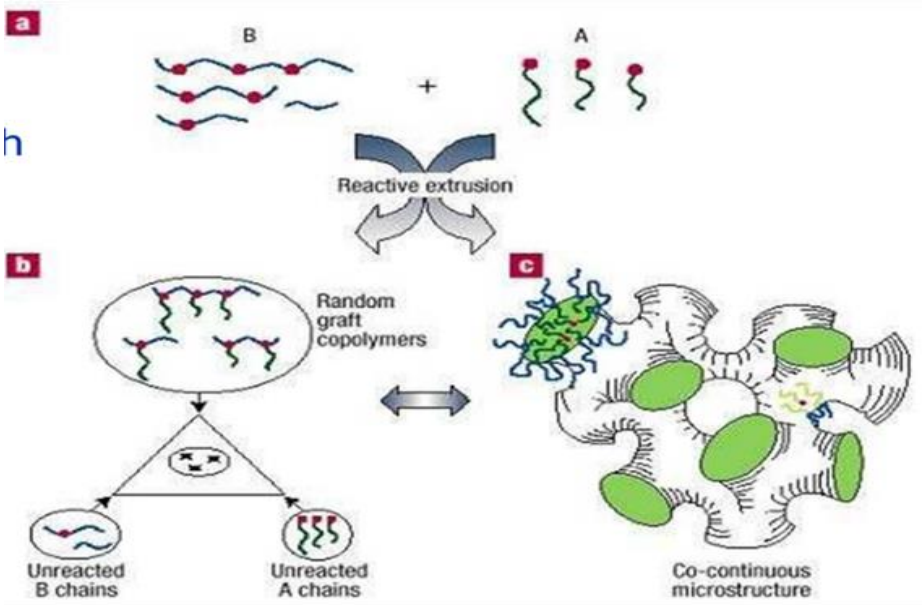




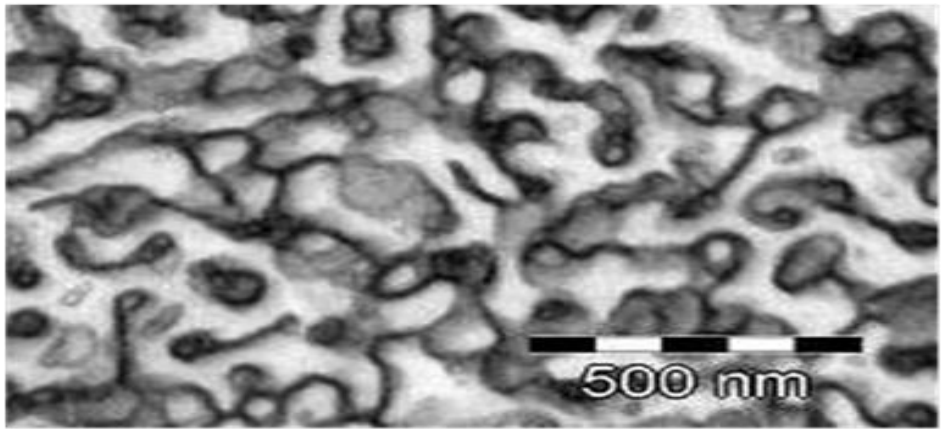
GPO Solution;

- ✓ We use proprietary Co-agents and Redox initiating system
- ✓ We use Nitroxide Mediated Polymerization for Controlled grafting reactions

WHAT MAKES GPO UNIQUE – (ALLOYS)



Reactive extrusion grafting



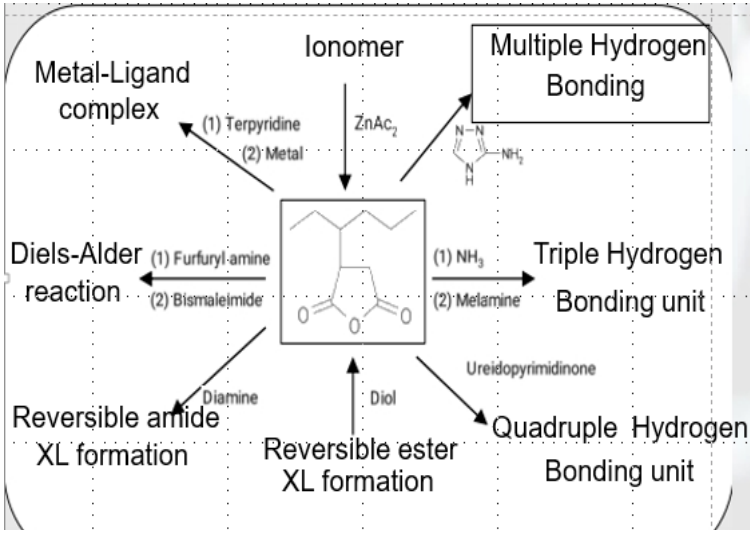
GPO Solution;

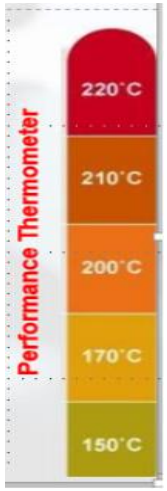
- Co-continuous nano-morphology,
- High temperature service elastomeric alloys,
- Melt Processable alloys based on Ultra High Molecular Weight Polyethylene (UHMWPE),
- Interpenetrating Polymer Networks (IPN) unique hybrid crosslinking techniques – crosslinked one polymer in another,

WHAT MAKES GPO UNIQUE – (CROSSLINKING)

GPO Solution;

- Thermo-Reversible Crosslinking polymers (High temperature resistance),
- Interpenetrating Polymer Networks (IPN) unique hybrid crosslinking techniques – crosslinked one polymer in another,
- Smart Polymers – switching temperature behavior,
- Self-Healing polymers





PO-g-MAH - Hydroxylamine

PO-g-MAH - Diol

PO-g-TEMPO - Isocyanate

PO-g-TEMPO- Peroxide

PO-g-Furan - Bismaleimide

WHAT MAKES GPO UNIQUE – (SYNTHESIS)

Halogen Free Flame Retardant based on Boron alkoxides (minimum addition to achieve V-0 requirements).

Home-made synthesis of Hyper Branched Polymers (HBP) and Drug Delivery Systems (DDS).

Home-made synthesis of unique “nitroxide stable radicals” for novel high tech synthesis.

WHAT MAKES GPO UNIQUE – (POROUS)

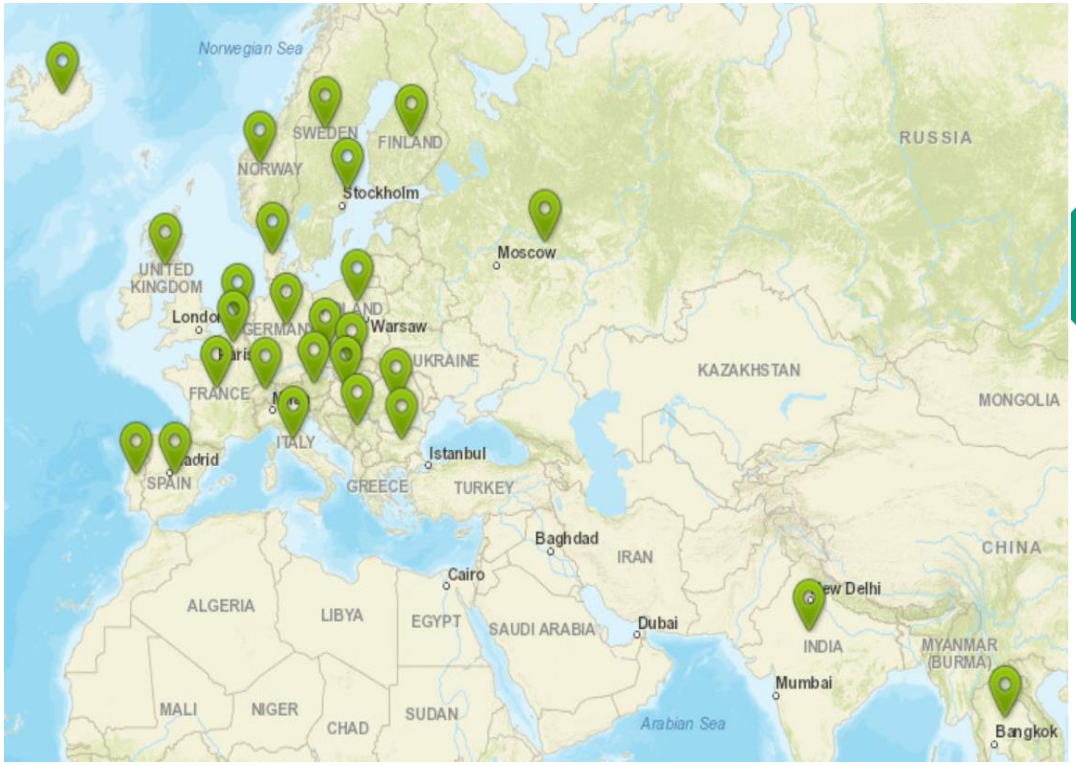
- POROSITY 80% -FREE FLOWING
- CLEAN CELL STRUCTURE FORMATION
- NO CHEMICAL OR PHYSICAL BLOWING AGENTS USED

Comparative view
Graftapore (left) vs Accurel (Membrana GmbH)

DISTRIBUTION NETWORK

GPO has signed distributorship agreements with well-known companies in the field.

- Ferro - Plast (Italy)
- C.H. Erbslöh GmbH & Co. KG
- Bedeko (Poland)
- Bharat enterprises (India)



Member of BPF and ISO 9001 Approved Slovenian Facilities

British Plastics Federation

Membership Certificate

This is to certify that

Graft Polymer (UK) Limited

is a member of

The British Plastics Federation

B. Margetts
PRESIDENT

P. K. Law
DIRECTOR GENERAL

D. R. Muir
COMPANY SECRETARY

Member Since 2018

This certificate is the property of the British Plastics Federation and in the event of the Company ceasing to be a member, for any reason, this Certificate must be returned immediately to The British Plastics Federation at 6 Bath Place, Rivington Street, London EC2A 3JE

BUREAU VERITAS
Certification

Certifikat

prejme

GRAFT POLYMER d.o.o.

EMONSKA CESTA 8, 1000 LJUBLJANA, SLOVENIJA

Bureau Veritas Certification Holding SAS – UK Branch potrjuje, da je bila opravljena presoja sistema vodenja v navedeni organizaciji in da je uvedeni sistem vodenja skladen z zahtevami sledečega standarda

STANDARD

ISO 9001:2015

PODROČJE CERTIFICIRANJA

MEDNARODNA DOBAVA MODIFICIRANIH POLIMEROV

Prvotni datum odobritve: **27/06/2018**

Datum zaključka certifikacijskega cikla: **27/06/2018**

Pod pogojem, da organizacija neprekinjeno zagotavlja zadovoljivo delovanje sistema vodenja, je veljavnost tega certifikata do: **26/06/2021**

Številka certifikata: **SL22419Q** *Izdaja:* **01** *Datum izdaje:* **27/06/2018**

Podpisano v imenu BVCERTLAT UK Branch

Naslov certifikacijske hiše: 5th Floor, 66 Prescot Street, London, E1 8HG, Velika Britanija
Lokalna pisarna: Linhartova cesta 49a, 1000 Ljubljana, Slovenija

Dodatna pojasnila v zvezi s podrobnim certificiranjem ter sistemom vodenja, ki ga pokriva ta certifikat, lahko dobite pri certifikacijski organizaciji.

Za podrobnejše informacije o veljavnosti tega certifikata pokličite: + 386 1 47 57 670.

Stran 1 od 1

UKAS MANAGEMENT SYSTEMS
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For additional information please contact

Pavel Kobzev (CMO)
Mob: + 386 40 867 937
Pavel@graftpolymer.com

Victor Bolduev (CTO)
Mob: +386 40 534 739
Victor@graftpolymer.com