NANOFORCE

Opportunities for Nanodeals Generator

Výskumný ústav chemických vlákien, a.s.
Research Institute for Man-Made Fibers, JSC

Štúrova 2 | 059 21 | Svit | Slovakia

Company profile / 60 yrs of history

Established:	1951 in Svit
Legal status:	(SME) privately owned JSC
Basic capital:	1.088 mil. €
Annual turnover:	2.90 mil. €
Export share:	50% (CZ, IT, DE, PL, RU, UA, LV, HU)
No. of employees:	78
Management systems:	ISO 9001:2008 & ISO 14001:2004

established for all R&D and production activities

ISO 9001 REGISTERED DNV MGMT. SYS. RvA C 024 DNV Certification B.V., The Netherlands

ISO 14001 REGISTERED DNV MGMT. SYS. RvA C 425 DNV Certification B.V., The Netherlands

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Activities

Production

- ✓ colour and additive masterbatches (PET, PBT, PA, PP, PE, PS, PMMA, PU, PLA based)
- ✓ PP staple fiber for technical and textile applications
- ✓ mechanical engineering and technology equipment manufacturing

Research and development

- ✓ EU structural & government funded, FP7 and industry co-financed projects
- ✓ PP, PET, PA polymers for fiber, films and plastics production
- ✓ spinning technologies
- ✓ pigments, additives & their mono- or multi-component masterbatches for applications in mass

Certification and other services

- ✓ testing labs accredited to ISO/IEC 17025:2005
- ✓ EU notified body no. 1634 for textile toys

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NANOFORCE: Nanodeal Generator Proposals

Ready-to-use products

A) fiber grade Carbon Black masterbatch (fulfills a definition for nano-sized material with annual production = 150 t)

B) antimicrobial masterbatch for PP yarn modification

C) nano-TiO2 masterbatch for polymeric systems providing important UV barrier properties

R&D projects

D) multicomponent masterbatch incorporating nano-sized additives for combined halogen-free FR, UV barrier and UV stabilization modification of PP yarns & plastic products

Nanodeal proposal (A)

Proposal description:

Masterbatch incorporating Carbon Black for mass dying of man-made fibers and plastics using PET, PBT, PA6, PP and PE polymer carriers.

Technology & product description:

COLORSVIT	CB content	Application
805-PT-22	22%	PES yarn
805-PB-30	30%	PES yarn
806-PA-25	25%	PA6 yarn
805-PA-20	20%	PA plastics
806-PP-20	20%	PP yarn
806-PE-30	30%	PE plastics

Nanodeal proposal (B)

Proposal description:

Masterbatch incorporating antimicrobial additive for mass modification of PP fibers.

Technology & product description:

Standard antimicrobial masterbatch **COLORSVIT 9212-PP-30B** incorporating 30% of inorganic additive with the surface treated by antimicrobial active silver particles.

Antimicrobial PP masterbatch is protected by the patent **SK 286186** (Antimicrobial additive concentrate for doping of synthetic fibers and plastics).

Antimicrobial fibers are protected by the patent **SK 286737** (Antimicrobial polypropylene fiber).

Both patents are in the ownership of VÚCHV, a.s.

Nanodeal proposal (C)

Proposal description:

Masterbatch incorporating nano-TiO2 for mass modification of PP fibers offering UV barrier properties.

Technology & product description:

Standard nano-TiO2 masterbatch **COLORSVIT 8500-PP-20** incorporating 20% of nano-TiO2 additive offering UV barrier modification for PP fibers.

Nano-TiO2 PP masterbatch is protected by the patent **SK 287999** (Polymeric nanopigmental dispersion and preparation method thereof) in the ownership of VÚCHV, a.s.

Product is fully characterized and available to the customers.

Nanodeal proposal (D)

Proposal description:

R&D project proposal for **multicomponent masterbatch** incorporating nano-sized additives for combined **halogen-free FR, UV barrier and UV stabilization** modification of PP yarns & plastic products

Technology & product description:

Due to the missing state-of-the-art technology the project's area hasn't been patented yet and masterbatch producers currently don't offer multifunctional solutions.

VÚCHV's patents cover individual modifications, e.g.: SK 287999 (Polymeric nanopigmental dispersion and preparation method thereof), SK 286602 (Heath and light stable polypropylene fiber)

For the success of this R&D project and for the validation and implementation of research results, close technical co-operation with the producer of PP fibers and PP plastics will be required. (For the area of PP fibers we suggest Chemosvit Fibrochem, a.s.)

Estimated R&D time is 2 years with the expected budget of 400 kEUR.

Nanodeal proposals - competences

Scientific competences & managerial experience:

R&D and production quality of the proposed masterbatch products will be guaranteed by the minimum of:

- 2 researchers/engineers with the minimum of 15 yrs of experience in the given area

- 2 technicians with the min. of 20 yrs of experience in the given area

VÚCHV, a.s. is fully equipped with the R&D infrastructure required for laboratory scale and pilot-scale research as well as standard production equipment incl. the equipment necessary for complex analytical evaluation of processing and utility properties of the masterbatch products.

R&D management is supported by at least 2 specialists with the minimum of 20 yrs of experience in the management of masterbatch R&D and production processes.

R&D services for polymeric systems, Man-Made fibers and their modifications

A) Research and preparation of colour and additive masterbatches for the modifications of synthetic fibers, films and plastics (PP, PA, PET and others)

- UV barrier protection
- Antimicrobial modification
- Light stability
- Nano-size additive modifications
- Thermochromic & luminescent properties
- Antistatic and conductive modifications (CB, C-NT)
- Other physical and chemical modifications of synthetic fibers
- FR modifications
- Surface dyeability of PP fibers
- Increased thermoplasticity

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A) Masterbatch and compound research

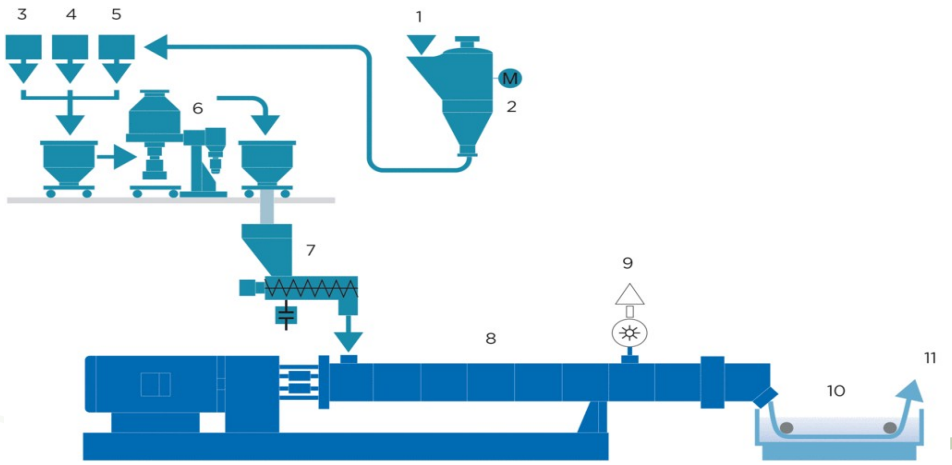
Premix based extrusion systems:

Laboratory scale:

- twin-screw extruder Werner & Pfleiderer φ = 28 mm
- filtration extruder φ = 25 mm

Pilot scale:

- twin-screw extruder Werner & Pfleiderer φ = 53 mm
- filtration extruder φ = 32 mm



R&D services for polymeric systems, Man-Made fibers and their modifications

B) Research and preparation of modified monocomponent and bicomponent (PP, PET, PA) synthetic fibers with defined structural, mechanical and application properties for:

- Textile applications
- Technical applications

R&D Infrastructure

Laboratory & pilot scale:

B1) ***Continuous Line 2x φ = 16 mm***

– mono-component and bicomponent (M/F, S/S, C/S) PO multifilament fibers

– continual process up to 2500 m/min

– outlet by air for simulation of spun-bond technology

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B) Fiber spinning research

B2) *LOY Discontinuous Line*

– main extruder φ = 32 mm, side extruder φ = 16 mm

– spinning up to 1500 m/min with sequential drawing

– mono-component and bicomponent (M/F) PP, PET a PA multifilament fibers

– sequential yarn texturizing optional

B3) *POY Discontinuous Pilot Line BARMAG*

– main extruder φ = 50 mm, side extruder φ = 16 mm

– spinning up to 4000 m/min with sequential drawing

– mono-component and bicomponent (M/F) PO multifilament fibers

– sequential yarn texturizing optional

– outlet by air for simulation of spun-bond technology

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B) Fiber spinning research

B4) *Continuous Line TV-2*

– extruder φ = 63 mm

– volumetric feeder of masterbatch

– spinning up to 2000 m/min

– mono-component PP multifilament technical yarns

– continuous yarn quenching by air optional

B5) *Continuous Line FLEISSNER*

– 2 main extruders φ = 50 mm, 2 side extruders φ = 25 mm

– continuous process up to 150 m/min

– mono-component and bicomponent (M/F) PO staple fibers

– cut length of 6 mm – 150 mm.

– fiber crimping optional

R&D services for polymeric systems, Man-Made fibers and their modifications

C) Complex evaluation of the properties of colour and additive masterbatches, fibers and textile materials by 118 testing methods (27 accredited methods) in laboratories accredited according to EN ISO/IEC 17025:2005

- Polymer rheology
- Light stability
- Physical-mechanical properties
- Flammability and antistatic properties
- Morphologhy and macromorphological structure
- Special evaluations, e.g. unknown substances identification, determination of technical characteristics of the materials
- Colouristic properties
- Eco-analytical analyses
- Thermal properties

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References of our technical co-operation

Pigments' development, assessment of their impact on the technological stability of spinning, structural and physical-mechanical properties of yarns

- CIBA AG
- Degussa AG
- Synthesia, a.s.
- Columbian Chemical Co.
- CABOT Corp.
- PRECHEZA, a.s.

Polymers' evaluation for different synthetic fiber spinning processes

- Slovnaft Petrochemicals
- BASF Polyurethanes
- Unipetrol, a.s.
- Pegas Nonwovens
- POLYMER INSTITUTE BRNO

Technology development for synthetic fiber and masterbatch production

- BARMAG AG
- Austin Detonator
- Nexis Fibers
- SILON
- Akzo-Nobel Membrana
- Moira
- Chemosvit Fibrochem
- Chemosvit Folie

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Thank you for your attention

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