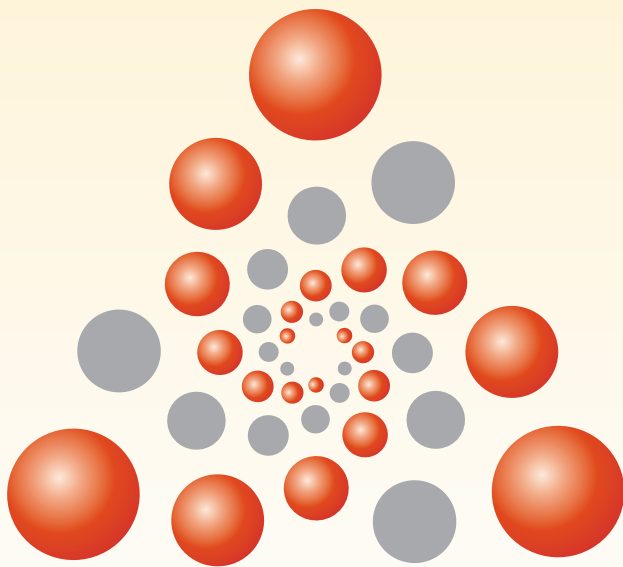


NFM is a consortium
of industry and academia
for research & development
in nano materials



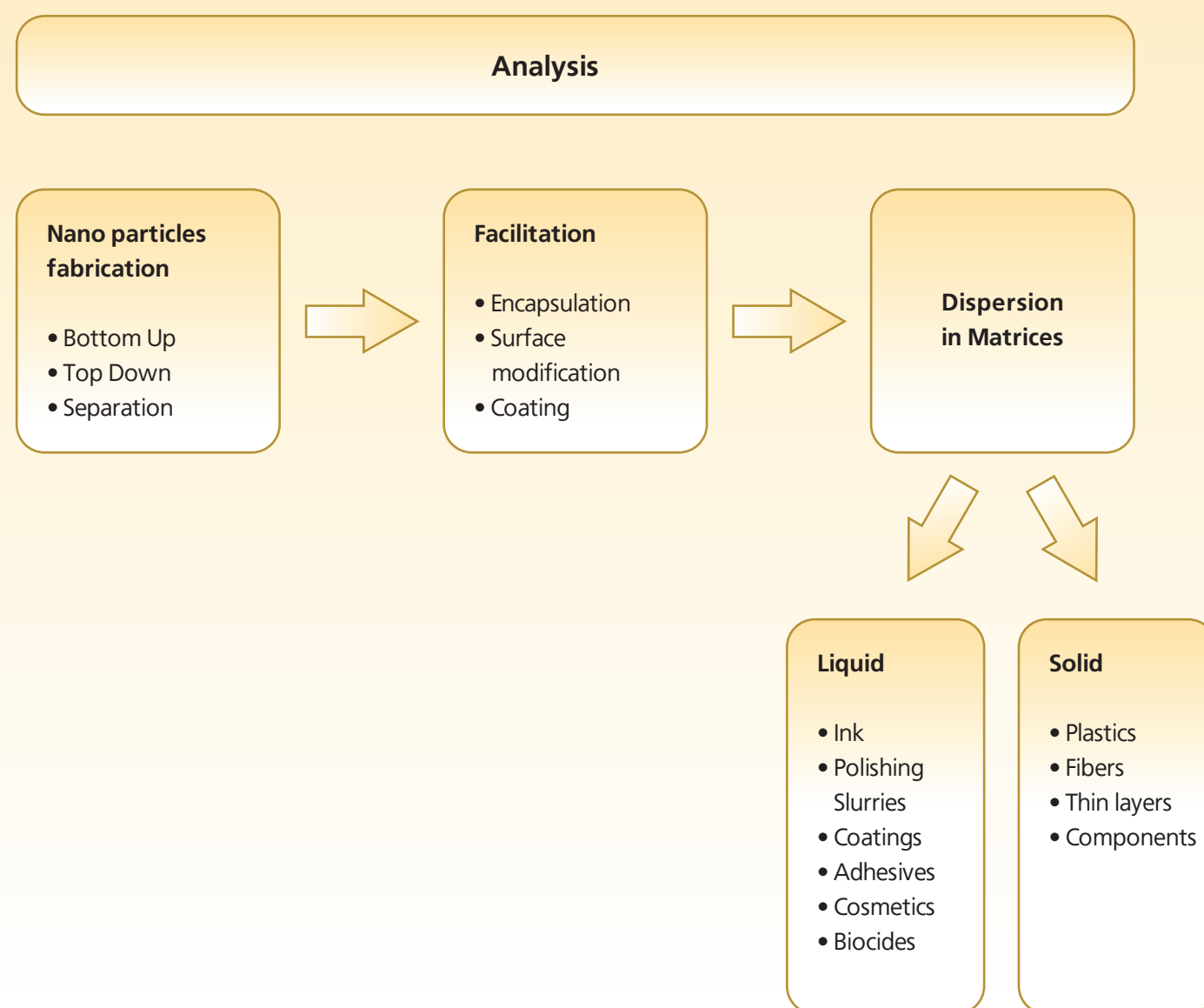
NFM Nano Functional Materials

The **NFM** consortium's goal is to become a leading platform for building a technological infrastructure in the field of nano materials, enabling the Israeli chemical industry to improve existing products, develop new products and penetrate into new markets. The consortium promotes cooperation and information sharing among large established industrial companies, fast growing technology start-ups and academic research groups as a key for the development of new capabilities crucial for future markets.

NFM is a consortium of 14 companies and 12 academic research groups in Israel, seeking new ways to fabricate and use nanoparticles in industrial processes and products. Nano-materials will provide enhanced performance for the end-user and enhanced value to the producer.

NFM combines the efforts and expertise of different disciplines to shorten the time for commercialization of innovative products based on the unique features of nanoscale materials.

Chain of application of Nano Materials



Ahava Dead Sea Laboratories Ltd. The company develops, manufactures and markets health and beauty products based on The Dead Sea minerals. Ahava skin care products contain the natural resources of the Dead Sea, mineral mud, saline water, algae extracts and Dead Sea crystals, and are successfully marketed all over the world. The company had joined the NFM in order to create novel nano dermatological and cosmetic formulations with improved performance. In the consortium the company is reducing particle size of Dead Sea minerals, creating nano emulsions and is working on formulating them into effective dermo-cosmetic and cosmeceutics preparations.

www.deadsea-cosmetics.com



B.G. Polymers are developing, producing and marketing water based pure acrylic, styrene-acrylic and vinyl acetate-acrylic copolymers. The company, which is the largest acrylic producer in Israel, supplies polymers and ready to use products for the building industry, textile and non-woven industries as well as inks, agriculture and unique niches. B.G. Polymers nano acrylate copolymers may vary from 50 nm up to 1000 nm depending on application. The company's activities in the consortium deal with surface modification technologies and ways to use nano acrylate as nano modifiers for other matrices. An important strategy is to combine nano acrylates with other molecular or nano size materials (biologically active, minerals etc) in order to achieve enhanced performance and introduce added value copolymers.

www.bgpil.co.il



Carmel Olefins Ltd. was established on April 1, 1991 as a result of a merger of the ethylene plant of Oil Refineries Ltd, and the polyethylene plants of Israel Petrochemical Enterprises Ltd. The current annual capacity of Carmel Olefins is 200,000 tons of ethylene, 165,000 tons of low-density polyethylene, and 200,000 tons of polypropylene. In addition, the company is also active in the field of specialized compounding and currently sells specialty compounds to the electronics and water-pipe industries. The company employs about 470 workers and is the predominant supplier of raw materials to the highly developed plastics industry in Israel. In the NFM, Carmel Olefins main objective is developing technology to impart high value added properties to commodity polyolefins (polyethylene, polypropylene) by incorporating functional nano-sized phase (NP) within the matrix polymer. www.carmel-olefins.co.il



Cerel is a start up company that has developed a unique ElectroPhoretic Deposition technology (EPD), enabling the company to control the deposition of nano particles on different substrates in a very precise manner. The company has also developed a dispersion technology enabling nano particles to be electrically charged to suit the EPD process. In the frame of the consortium the company focuses on building nano layers for electronic components and using the EPD process for new applications such as separation and polishing. www.cerel.com



DSBG is the world's leading producer of elemental bromine and a recognized leader in the development and supply of a growing family of bromine compounds. The company draws on the vast resources of the Dead Sea (Israel) to promote quality of life and fire safety worldwide. The company is organized into four divisions including Industrial Chemicals, Flame Retardants, Soil Treatment and Biocides. Bromine-based compounds are being applied in more and more industries as innovative R & D enables natural resource optimization, adherence to strict standards of safety and high levels of environmental performance. The company is ISO 9000 9002 and 14001 certified. The company manufactures in Israel, the USA, the Netherlands and China The main focus of DSBG in the consortium is in preparing nano sized fire retardants and studying their properties and advantages. The company is studying processes such as milling, controlled synthesis, separation and drying of nano particles. www.dsbg.com



El Op is a world leading electro optic company. The company develops and produces displays, laser systems, thermal systems and cameras. The company employs more than 1000 employees of which 40% are engineers and scientists. In the frame of the consortium El Op develops super polishing slurries based on nano particles and optical switches based on nano semi conductors. The company is dealing with dispersion of nano semi conductors in polymer matrixes, and with the production and dispersion of nano oxides in water based polishing slurries. www.el-op.co.il



Kafrit specializes in compounding of thermoplastic materials and producing master-batches and compounds. The company is publicly traded in the Israeli stock exchange. Kafrit specializes in plastics for agricultural applications, including UV stabilizers and absorbers, flame-retardants, color concentrates and poly carbonate. The company employs 160 employees in Israel, and has extensive activities in Europe as well. In the frame of the consortium Kafrit is mainly interested in the ability to disperse nano functional materials in plastics during the compounding process. The main interests are in radiation blockers and fire retardants. The company is working on both dispersion and analysis of properties of polymers containing nano particles. www.kafrit.co.il



Makhteshim was established in 1952, in the Negev, the desert in the south of Israel. The company's core business is generic agricultural products, mainly insecticides and fungicides. The company is also producing other fine and commodity chemicals. Makhteshim is a privet company owned (100%) by Makhteshim-Agan industries. Makhteshin-Agan Industries total sales exceed 1 billion \$/year in over 100 countries around the world. Makhteshim is interested in reducing the particle size of its plant protecting products. The assumption is that the smaller the particle size, the higher the biological activity, and therefore the possibility to reduce the applied doses. This assumption is being studied by the company in the frame of the NFM. www.makhteshim.co.il



NanoPowders Industries (Israel) Ltd. a subsidiary of Cima NanoTech, Inc.
The Global Leaders in Nano Metals.

NanoPowders Industries a subsidiary of Cima NanoTech, a USA based company are the world leaders in nano metal powders synthesis and application technologies. Cima NanoTech NanoPowders is the only company today demonstrating commercial scale manufacturing of silver nano-metal dispersions. These dispersions are the enabling technology for next generation digital inkjet printing of microcircuits and transparent conductive coatings for electronic displays. In the consortium NanoPowders Industries is further developing its dispersion abilities and is cooperating with partners to incorporate nano metals into a variety of matrices such as plastics, fibers, inks, and more. The company is working extensively on understanding the particle size-performance relations. www.nanopowders.com



Nano-size Ltd. is a privately owned start up company with innovative and unique processes and specially designed equipment based on ultrasound. The technology developed by Nano-Size is employed in two main areas:

1. **Sonochemical Synthesis**
2. **Ultra Fine Grinding (UFG)**. These processes are used to achieve the production of metal and oxide particles of nanometric size such as iron, silver, iron oxide, barium titanate and more, and is capable of ultra fine grinding organic and inorganic materials by a significant ratio. The processes are short and simple, and products are virtually uncontaminated. Nano-Size is collaborating with other companies in the consortium on reducing particle size, incorporating nano particles into a polymer matrix, and material synthesis.

www.nano-size.com



Nilit is a private company established in 1971 in the northern part of Israel. The company has established its position in the world as a producer of high value added nylon fibers for a variety of applications. The company has extensive technical support and sales network in Israel, Europe and North America. Nilit is focusing on the ability to add nano functional particles to nylon fibers to achieve a number of attractive properties such as: Improved mechanical properties, health care performance, improved look and other benefits. Nilit has also activity in polymer compounding where nano particles will be used. www.nilit.com



Scitex Vision * is the leading developer, manufacturer and service provider of cutting-edge digital printing process and consumables for industrial applications, including wide format graphic arts, packaging and textile. Scitex Vision leads the industry in introducing advanced technologies in printers and consumables. Our unique digital printing technology is characterized by high quality, very high digital printing speeds, extensive media versatility and durability through simplicity. The unique Aprion piezo drop-on-demand technology is a key Scitex Vision technology. In the frame of the NFM the company is developing new generation of inks, based on nano technology of pigments and polymers, to achieve new, high performances inks and films such as: ultra high jetting performance (drop velocity, directionality, jetting stability), conductivity, stabilization, better colors gamut and more, respectively. www.scitexvision.com



Sol-Gel Technologies intends to become a world leading supplier of active materials. The company has an exclusive distribution agreement with Merck KGaA for its "UV pearls", encapsulated UV blocker for sun screen creams. The company's core technology is a sol-gel technology to produce "glass" coating for a variety of materials. The company has extensive patent coverage for its unique technology. Sol Gel Technologies employs 20 employees and it is a company in early stages of commercialization. In the consortium Sol-Gel's process is applied to produce nano particles and to encapsulate nano particles for applications such as electronics, cosmetics, printing and agriculture. www.sol-gel.com



Solubest was established in 2001 as a start up company, to commercialize its patented "SOLUMER" technology. This technology enables the company to disperse very efficiently a variety of materials in environmentally friendly water phase, by coating them with a proprietary polymer. The technology is applicable for organic and inorganic materials, for liquids and solids. The technology has great potential in many fields such as: pharma, electronics, agriculture and more. In the consortium Solubest is cooperating with other members to develop the SOLUMER technology in order to facilitate synthesis, production, dispersion and activation of nano materials. www.solubest.com

Bar Ilan University through



Prof. Aharon Gedanken - Synthesis and modification of a variety of nano particles by sono-chemical methods. Using such methods for deposition of nano particles onto polymeric and other solid matrices. gedanken@mail.biu.ac.il

Prof. Shlomo Margel - Synthesis and characterization of nano organic and inorganic particles. Modification of nano particles with active materials by surface chemistry and encapsulation. marges@mail.biu.ac.il

Prof. Chaim Sukenik - Development of chemistry for the surface functionalization and/or encapsulation of nano particles and to facilitate their de-agglomeration and dispersion. sukenc@mail.biu.ac.il

Prof. Arie Zaban - Synthesis, characterization and application of nano oxides, core shell nano systems, nano porous layers and surface modification of nano particles. zabana@mail.biu.ac.il

The Hebrew University of Jerusalem through



Prof. David Avnir - Encapsulation of active materials, such as optically, chemically and biologically active ingredients by a sol gel technology, in form of nano particles and matrices. adin@vms.huji.co.il

Prof Uri Banin - Preparation of novel semiconductor nanocrystals and nanocrystal arrays and composites of nanocrystals and other materials, studies of optical and electronic properties of nanocrystals and their assemblies and development of nanocrystal based optical and electrical devices. banin@chem.ch.huji.ac.il

Prof. Nisim Garti - Fabrication and stabilization of nano particles via emulsions and liquid dispersion. Modification of surface properties to a variety of applications. garti@vms.huji.ac.il

Prof. Shlomo Magdassi - Development of methods for preparation and dispersion of a wide range of nano materials such as : metals, oxides, organic materials and bio polymers. Formulation of dispersion and encapsulation systems. magdassi@cc.huji.ac.il

The Technion, Israel Institute of Technology through



Prof. Yachin Cohen - Development of analytical methods for characterization of morphology of complex nano systems and studying the influence of structure on activity and performance of these systems. Yachinc@tx.technion.ac.il

Prof. Moshe Narkis - Fabrication and application of multi-phase polymer systems for dispersion of nano particles, mainly nano oxides. narkis@tx.technion.ac.il

Prof. Ishayahu Talmon - Analysis and characterization of structure - activity relations in nano particles and nano complex liquids, using mainly electron microscopy methods such as Cryo-TEM, high resolution SEM and more. ishi@tx.technion.ac.il

Dr. Yoed Zur * - Fabrication and characterization of nano particles, mainly the strength of agglomeration and coagulation of such particles and its dependence on composition and structure. The group is going to use newly developed "nanoindentation" methods. tsur@techunix.technion.ac.il

**Information Center: The Neaman Institute.**

The Samuel Neaman Institute for Advanced Studies in Science and Technology is an independent public-policy research institute, established in 1978 to assist in the search for solutions to national problems in science and technology, education, economy and industry, and social development. As an interdisciplinary think-tank, the Institute draws on the faculty and staff of the Technion, on scientists from other institutions in Israel, and on specialists abroad.

The information center goals are:

- Knowledge collaboration among consortium members.
- Managing relevant internal information.
- Information supply from international databases.
- High accessibility via web interfaces.

daphne@tx.technion.ac.il

* Candidate in process of approval

The **NFM** Consortium for nano functional materials is interested in expanding its horizons through cooperation with related research groups and industries around the world. Joint projects are sought, involving the consortium as a whole or with selected groups within the consortium.

Contacts:

Dr. Fernando de la Vega

Consortium Chairman

> delavega@nanopowders.com

Dr. Rebecca Goldscher

Program Manager

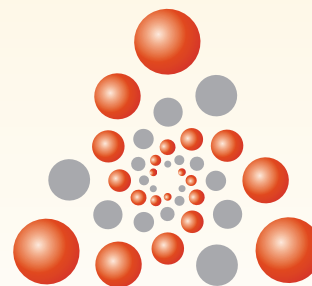
Office of the Chief Scientist, Israel

> rebeccag@netvision.net.il

Dr. Eynat Matzner

Consortium Manager Technology

> matzner@adi.org.il



NFM Nano Functional Materials



MAGNET PROGRAM

Activating and supporting on behalf of the **MAGNET** program, the Office of the Chief Scientist in the Ministry of Industry, Trade and Employment, Israel. www.magnet.org.il