

# materia gris

Grey Matter. New materials for the post-fossil era

CENTROIN3C+

With the planet's natural resources on the verge of exhaustion and in a consumer society bent on producing waste in vast quantities, the time has come for creative minds to apply themselves to the search for new systems of rational production and consumption. Many designers are playing an important role in the research and development of materials that they are putting forward as more intelligent alternatives in line with the needs and challenges of the 21st century.

The "Grey Matter" exhibition is a compilation of new materials that are currently emerging and indeed multiplying in the field of design at an unprecedented rate; a veritable material revolution unparalleled at any other time in history. Engineers, architects, biologists, botanists... many professions are involved in the development of this field which is so vast that it is hard to condense it into one single exhibition. In this exhibition therefore, we have focused our attention on a number of examples (forty or so) drawn from projects in which designers are experimenting with materials that may be able to take the place of plastics and other raw materials. These so-called "biomaterials" are particularly interesting due to their biodegradable nature and indeed the challenge for the future of industrial production - the elimination of single-use plastics and their replacement by more sustainable versions - lies at the heart of these projects. We present leathers made from seaweed or apple waste, textile fibres produced by manipulating pine needles, plywood made from corn cobs, and many other surprising materials.

This issue is one of the major concerns of contemporary design and will be represented by objects made from these materials, whose raw materials are seaweed, bacteria, milk, mushrooms, molluscs, kombucha, fruit, etc. Many of them have their origin in the re-use of industrial waste - including that of the food industry - others are by-products of industrial manufacture, others stem from the manipulation of natural elements, and yet others are the result of extensive scientific research. The projects have been selected on the basis of their interest from a design point of view, in other words, taking into account the way in which the designers not only manage to solve a problem but also how they apply their ingenuity and creativity by experimenting with these new materials - materials with which they also express their own personal, political and social concerns, their sense of humour, and their interpretation of cultural parameters.

We have a wide range of projects on display, a number of them purely experimental, others on the cusp between design and art, and some that are already being used in industrial production, highlighting the fact that even though they are recent research, the importance of sustainability in today's world is accelerating change in large companies that are committed to planet-friendly production and to the circular economy. In fact, the display of the exhibition, designed by Lucas Muñoz, is conceived following the same guideline, and it is considered as another project itself.

**Ana Domínguez Siemens**  
Curator

# PROJECTS

**Pascal Leboucq & Lucas de Man (Biobased Creations / Company New Heroes)**

“The Exploded View” (2020)

[www.theexplodedview.com](http://www.theexplodedview.com)

The Exploded View is an installation that incorporates the possible application and potential of all kinds of new biomaterials in the pursuit of an efficient circular building.

**Neri Oxman (Mediated Matter Group)**

“Aguahoja I” (2018)

[www.oxman.com](http://www.oxman.com)

“Aguahoja I” (which means “Water-leaf”) is a structure that is digitally manufactured using cellulose, chitosan and pectin, components that are found in abundance on the planet. The project draws our attention to a possible system of biopolymers that uses energy and resources in a more efficient way to offer an alternative to plastics.

**Erez Nevi Pana**

“Recrystallizing the Desert” (2020)

[www.ereznevipana.com](http://www.ereznevipana.com)

The first factory in the Dead Sea was established in 1930, since then, a massive gradual growth of the minerals industry has taken place in the southern basin of the Dead Sea. Every year 20 million tons of salt sink to the bottom of the Dead Sea's fifth pond, a cultivated area filmed in the video. The salt is discarded waste from the manic production line of potash and bromine in the Dead Sea factories.

Addressing the loss of value of a material which used to set the world in motion, Nevi Pana suggests the development of a production method using NaCl as the main substance for Salt Architecture. A new paradigm, changing the position of salt from waste, to a desired, attractive and sought after commodity. A path to a new application of a beautiful substance with practical usage.

As part of his research into salt, the designer went a step further by immersing structures with a vegetable coating into the Dead Sea so that they could absorb salt which will eventually crystallise into coral-like formations.

**Rodrigo García González y equipo Notpla**

Olive oil sachets, wrapping paper, Ooho (water bubbles), takeaway boxes, “Notpla” wrapping film (2014-2021)

[www.notpla.com](http://www.notpla.com)

Notpla is a material made from seaweed and plants that biodegrades in four to six weeks. It has all sorts of uses, from wrapping film to single-use sachets for ketchup or mayonnaise, water bubbles, nets, etc.

**Scarlett Yang**

“Decomposition of materiality” Samples (2020)

[www.scarletty.com](http://www.scarletty.com)

With seaweed extract, water and coloured dye, the designer has created a liquid biomaterial that is poured into moulds and allowed to solidify. She then applies a silk cocoon protein, normally discarded in the textile industry, to the areas she wants to wrinkle or shrink.

**Studio Swine (Azusa Murakami & Alexander Groves)**

“Hair Highway” Combe (2014)

[www.studioswine.com](http://www.studioswine.com)

Few raw materials are as abundant as human hair and this project explores how it can be used to make a material similar to tortoiseshell.

**Studio Thus That**

“Red Mud” Vessels (2019)

[www.thusthat.com](http://www.thusthat.com)

Red clay (bauxite) is a by-product of the aluminium manufacturing industry that can be used as a ceramic material and for glazing.

**Tom Metcalfe**

“Tailoring Composites” Vase (2016)

[www.tommetcalfe.com](http://www.tommetcalfe.com)

This translucent composite material is made from flaxseed and bioresins. It is intended as a sustainable alternative to carbon fibre.

**Manuel Jouvin**

“Dejection-molding” Packaging for cooked snails (2010)

[www.manueljouvin.com](http://www.manueljouvin.com)

While researching snails, the designer discovered that coloured paper affects the hue of their droppings which led him to team up with a breeder to create packaging for cooked snails made from their own droppings. Instead of the more usual recycled paper, these containers are produced by the industrial process used to produce moulded cellulose.

## **ELISAVA**

**VISIONS BY MAGAZINE (2018/2019)**

[www.visions-by.com](http://www.visions-by.com)

Editors: Saúl Baeza and Laura Clèries

Design: Oficina de disseny (Ariadna Serrahima, Diego Bustamante, Katharina Hetzeneder)

Promoter: Elisava Research

VISIONS BY is an annual magazine that addresses different perspectives on material culture through a critical and speculative lens. It explores the diverse ways in which materials are understood and how they are involved in the activation and dynamisation of socio-economic cultures and systems.

### **COMMERCIAL CIRCULAR MATERIALS**

**RECYCLED GLASS (C-1329):** Recycled Glass™ is one of Lumicor’s decorative collections. The materials contain an aggregate of 98%-100% post-consumer recycled glass obtained from crushed bottles, sheets, windows and other glass products.

**GLASKERAMIC (CR-V-1017):** Material made from 100% recycled or industrial glass or glass from bottles. It is 100% recyclable.

**RECYCLED TERRAZO (CR-1120):** Experimental Terrazzo is a collaboration between Hugueta, a tile company based in Majorca, and APT, an architectural practice based in the UK, using common waste materials from the construction industry.

**TAPLAST (PL-TP-2139):** TAPLAST is a recycled PE board in which the initial waste material has been transformed into chips and subsequently pressed to obtain rigid, machinable boards.

**ECOPIXEL (PL-TP-2134):** ECOPIXEL is a material made from 100% pre-consumer recycled low-density polyethylene (LDPE) that is cast at the lowest possible temperature to minimise its ecological impact.

**RECYCLED RUBBER (PL-E-1015):** Material designed by Nanimarquina to create rugs from the recycled inner tubes of bicycles collected in India.

**TREEPLAST(C-1336):** Treeplast is a composite of wood, flour and natural resin that combines a natural appearance and texture with enormous freedom in terms of product shape.

**CORKOCO (N-C-1013):** Corkoco is a coconut fibre panel sandwiched together with a cork agglomerate panel.

**MycoComposite (N-O-4021):** Ecovative Design has developed MycoComposite™, a composite that uses mycelium, the root structure of fungi, as a biological binder for wood by-products and waste from hemp cultivation.

**PIÑATEX:** Piñatex® is an innovative natural textile material that uses the leaves that are a by-product of the pineapple harvest, thus avoiding the need for extra water or soil consumption or for other chemicals that would otherwise be needed to produce the raw material. This material offers a more ethical, economical and environmentally responsible alternative to leather, a material that is not only becoming increasingly expensive and scarce but also involves chemical tanning, a process that causes considerable pollution.

## **MaDe PLATFORM**

MaDe, a project co-funded by the Creative Europe Programme of The European Union, aims at boosting talents towards circular economies across Europe partnering with design and cultural institutions, Elisava, Ma-tt-er and Politecnico di Milano.

### **Paula Nerlich**

"Aqua Faba Foam" (2019-20)

Biomaterial made from legumes

### **Magdalena Sophie Orland**

"BETWEEN\_SPACES" (2019-20)

Natural latex with additives

### **Andrés Ramírez Ruiz**

"Posidonia / Seafloor" (2019-20)

Sewn Seafloor balls

### **Bianca Streich**

"GOMMA" (2019-20)

Repurposed chewing gum, weaving and sculpting techniques

## **ELISAVA STUDENTS**

**Akna Márquez**

“Re-incarnation” (2019)

Recycled ceramic material made with mould

**Alberto Gracia Virgos**

“RE-DAR” (2019)

Ceramic pieces. Tiles and ceramic Re-Dar glaze coming from mud of treatment system

**Gemma Delgado Morell**

“Photodermis” (2020)

Smart Biodyes made of coffee grounds and biodegradable photovoltaic panels

**Laura Freixas Conde**

“O-knit, Future Textile Threads” (2018)

Bacterial cellulose

**Marta Tudurí, Noemí Vives and Laia Pich**

“MONOMA” (2020)

Exploratory and analytical Study of bacterial cellulose

**Gerard Bel, Damià Cusí, Marta Galofré, Laia Moras and Marina Sevillano**

“Clint” (2019)

Cardboard made from textile wastes from dryers of laundry. Designed together with Girbau

**Licia Desideri**

“Blue Shel(l)ter” (2020-2021)

Mussel shell and alginate

**Marina Álvarez**

“Paper” (2020)

Solid ash. Frame in rigid polyurethane and padding in CFC-free polyurethane foam.

Upholstery Leather. Apple Ten Lork



### **Inés Sistiaga**

“Preen” Brushes (2015)

[www.inessistiaga.com](http://www.inessistiaga.com)

Most vegan beauty brushes are made with synthetic bristles. This project explores the possibilities of producing them with vegetal fibres, giving unexpected uses to such natural materials as coconut fibre, jute, natural sponge or “mother-in-law’s tongue”.

### **Basse Stittgen**

“How do you like your eggs” flower vase, jewellery box and egg holder (2019)

[www.basse-design.de](http://www.basse-design.de)

The raw material for this bioplastic, which has no other additives is the recycled waste from the production of eggs: shells and egg whites.

### **Julia Lohman**

Experiments with seaweed (2013-2020)

[www.julialohmann.co.uk](http://www.julialohmann.co.uk)

Based on her initial experiments with Japanese “naga” seaweed, she succeeded in creating a flexible and translucent material, similar to leather in terms of its strength. Since then, she has researched various types of seaweed from different places of origin and their potential use in combination with other organic materials.

1. Sample of “Laminaria japonica” seaweed, Japan
2. Sample of “Saccharina latissima” seaweed, Sweden
3. Prototype combining “Saccharina latissima” and rattan
4. Rattles made from shells and seaweed from Norway
5. Prototype combining seaweed, plywood and rattan
6. Seaweed spread over oyster shell
7. Prototype of seaweed secured between two plywood frames
8. Prototype of algae with rattan whales
9. Two seaweed rings
10. Sample of “bladderwrack” seaweed
11. “Scoubidou” seaweed
12. Two pieces made in a mould with seaweed
13. Sheet of lacquered seaweed
14. “Saccharina latissimi” dyed with pastel grass
15. Norwegian seaweed
16. Base of Australian bull kelp

**Gianantonio Locatelli**

“Merdacotta” tableware (2016)

[www.theshitmuseum.org](http://www.theshitmuseum.org)

The Shit Museum has developed a ceramic made from dried cow dung, clay, straw and other farmyard waste. The manure is subjected to a process that removes the methane and the urea, leaving it odourless.

**Kosuke Araki**

Three pieces of “Anima” tableware (2018)

[www.kosuke-araki.com](http://www.kosuke-araki.com)

The waste produced by the food industry (charcoal from vegetable waste) has been combined with Japan’s typical “urushi” lacquer to produce this black, highly resistant material.

**Baptiste Cotten**

“Second Skin” (2020)

@baptiste\_cotten

Ictyos is a company that is transforming salmon skin, a by-product of the agri-food industry, into leather. The only problem is the reduced size of the skin. The designer has been working on solutions to allow this skin to be used more effectively. Similarly, salmon scales are being transformed into a natural material by the firm Scales, the designer has developed a catalogue of simple assembly methods that only require water as a glue.

**Carolina Pacheco / Licia Desideri**

“Calcáreo” various objects (2020-2021)

[www.calcareo.cl](http://www.calcareo.cl)

Calcáreo is a project by Carolina Pacheco in which she experiments with the optimisation of a biocomposite made from mussel shells and a solution made from alginate, a polysaccharide derived from brown algae. The project has made three open-source recipes available that allow it to be applied in different design ‘manufacturing ecosystems’: one for moulds, one for extrusion, and the other for hand moulding. Once its life cycle has come to an end, it can be immersed in water where it dissolves and is reintegrated into the ecosystem. The designer Licia Desideri has experimented with these recipes to create a series of objects.

**Tessa Silva**

“Chub Vase I” from the “Chalk and cheese” collection (2020)

[www.tessasilva.com](http://www.tessasilva.com)

A vase made from a material that investigates the use of proteins from surplus milk and calcium carbonate from chalk quarries.

**Crafting Plastics! Studio (Vlasta Kubušová & Miroslav Král)**

“Nuatan” vases (2018-2020)

[www.nuatan.com](http://www.nuatan.com)

Nuatan is a bioplastic obtained from natural resources such as corn starch, potatoes and recycled oil. Thanks to its exceptional properties it can be processed by all the traditional technologies that are used in the plastic industry.

**Valdís Steinarsdóttir**

“Just Bones” vase (2017)

[www.valdissteinars.com](http://www.valdissteinars.com)

The raw material for this resilient material is the dust released when the bones of animals are ground after they have been slaughtered.

**Álvaro Catalán de Ocón**

“Terrazzo Alhambra” fruit bowl and panels (2017)

[www.acdo.es](http://www.acdo.es)

Alhambra terrazzo is a combination of glass beer bottles (Alhambra beer) sectioned in such a way that they produce unexpected designs, with cement, marble and coloured resin.

**Naifactory Lab (Silvana Catazine & Joseán Vilar)**

“Symbiosis” vase and stand (2020)

[www.re-naif.com](http://www.re-naif.com)

Olive pits, a by-product that is burnt as a biomass, are recycled for a material which basically, when mixed with other 100% natural ingredients, can be turned into a wide variety of textures with different characteristics, depending on the quantity and quality of the pits (granules, powder or flour) used.

### **Studio Lionne van Deursen**

“Biotic” samples and “Luna” lamp (2020)

[www.lionnevandeursen.com](http://www.lionnevandeursen.com)

This studio is experimenting with bacterial cellulose, a material that results from the process of fermenting bacteria and yeast. They have also experimented with natural dyes obtained from fruit waste, observing how these affect their colour, texture or translucency.

### **Jorge Penadés**

“Structural Skin” lamp (2015)

[www.oficinapenades.com](http://www.oficinapenades.com)

“Structural Skin” is an experimental material made from leftovers and offcuts from the leather industry that are sliced into strips and pressed with an binder of animal origin.

### **Studio Thus That**

“Copper Slag” lamp (2020)

[www.thusthat.com](http://www.thusthat.com)

The material used in this project is the slag of the smelting process, which can be used as a cement.

### **Silio Cardona**

“Maderón” (1994)

Ramón Ubeda Collection

The “Rothko” chair by Alberto Liévore (Indartu) is made with Maderón, a material obtained from a secret mixture of resins and finely ground almond shells that are blended together to create a moldable paste with wood-like properties.

### **James Shaw & Marjan van Aubel**

“Well Proven” chair (2013)

[www.wellprovenchair.com](http://www.wellprovenchair.com)

When you combine sawdust left over from the manufacture of wood with a bioresin, a curious chemical reaction takes place that results in a moldable foam to which you can add colour and structure.

**Patricia Urquiola / Apple Ten Lork**

“Back Wing” chair upholstered with Apple Ten Lork material. Cassina (2018)

[www.patriciaurquiola.com](http://www.patriciaurquiola.com)

[www.cassina.it](http://www.cassina.it)

[www.mabelsynthetic.com](http://www.mabelsynthetic.com)

The Apple Ten Lork and Apple Ten Pam produced by Mabel srl is a sustainable material similar to leather that is made from fibres derived from the waste generated by the industrial processing of apples.

**Vollebak (Nick & Steve Tidball)**

“Plant and Algae” T-shirt (2019)

[www.vollebak.com](http://www.vollebak.com)

A T-shirt made from seaweed and eucalyptus and beech pulp. It can be composted once its life cycle has come to an end, and it decomposes in twelve weeks.

**Alix Bizet**

“Hair Matter(s)” jackets (2015)

[www.alixbizet.com](http://www.alixbizet.com)

In this project, which straddles anthropology and craftsmanship, human hair has been used to make garments that speak of diversity and position themselves against a standardised society.

**Woojai Lee**

“PaperBricks” (2016)

[www.woojai.com](http://www.woojai.com)

PaperBricks are bricks that are made from newspaper pulp mixed with glue and pressed into a mould. They can be cut, stuck together or drilled in the same way as wood.

**Tamara Orjola**

“Forest Wool” stool (2016)

[www.tamaraorjola.com](http://www.tamaraorjola.com)

A stool from the “Forest Wool” series made from a material obtained from pine needles (which account for around 20 to 30% of its volume) and which can be turned into fabrics, conglomerates and paper using standard manufacturing techniques.

**Studio Sarmite**

“Pine Skins” carpet (2019) and “Pine Resin” vases (2020)  
[www.studiosarmite.com](http://www.studiosarmite.com)

Carpet and vases made from pine bark in an experiment that involves the texture, colour and smell of the bark.

**Mogu (Maurizio Montalti and partners)**

“Mogu Acoustic - Wave Hex” acoustic panels (2019)  
[www.mogu.bio](http://www.mogu.bio)

These acoustic panels are made from a low density mycelium-based composite material made from fungi grown in moulds.

**Mogu (Maurizio Montalti and partners)**

“MOGU Floor - Oyster” modular floor (2020)  
[www.mogu.bio](http://www.mogu.bio)

These flooring products are made from a high density mycelium-based composite material made from fungi and a proprietary biopolymer.

**Mogu (Maurizio Montalti and partners)**

“Mogu Board” composite material prototypes (2018)  
[www.mogu.bio](http://www.mogu.bio)

Samples of four high-density mycelium-based composite materials grown on various fibres left over from the agri-food industry such as cotton, hemp fibre or an herbaceous plant called Miscanthus.

**Nacho Carbonell**

Model for “Tree Chair” (2008) and several samples of materials made with such elements as leaves, sawdust and cork, all mixed with natural resin  
[www.nachocarbonell.com](http://www.nachocarbonell.com)

The piece is made with metal rods and mesh and a paste made out of cork and a natural resin created by the designer.

### **Formafantasma x Dzek**

ExCinere fireplace and step (2019)

[www.dzekdzek.com](http://www.dzekdzek.com)

ExCinere is a collection of glazed tiles made from volcanic ash in four shades that range from caramel to dark brown. They are made by mixing and firing different particle sizes and lava densities in varying quantities.

### **Fernando Laposse**

"Totomoxtle" plywood sheets (2016)

[www.fernandolaposse.com](http://www.fernandolaposse.com)

A material for plywood made from the leaves of native Mexican corn cobs, which produce colours ranging from violet to cream. The leaves are pressed and glued to a paper or fabric from which they can be cut into pieces that can then be used in marquetry.

### **Lucas Muñoz**

"Materia Gris", a system for an exhibition (2021)

[www.lucasmunoz.com](http://www.lucasmunoz.com)

For this exhibition, Lucas Muñoz, together with his collaborators Ines Sistiaga and Joan Vellvé Rafecas, has designed a series of systems of return and circularity, that make the exhibition a medium to reach ends that reach further than cultural goals.

To make the podiums below the pieces, Lucas and his team emptied CentroCentro storage rooms, and took out all possible objects accumulated from previous exhibitions. These objects, structures, vitrines and podiums that we can see along the exhibition path, are temporarily stored within this spatial design. During this time, storage rooms find a new order and at the end of the exhibition only the elements that could be of use in future events will be taken back to the underground storage. For this purpose, all objects there found have been documented in an inventory.

All lamps in the exhibition have been produced by the students of Norte Joven. These lamps are substituting rental light systems, and their sale (at an online platform during the exhibition period) will add funds to this Association to develop their social project. Follow the QR code at the bottom to get one! The scaffolding nets that are covering all objects under the board will find a second life transformed into different bag models designed by Ines Sistiaga and Lucas Muñoz. As with the lamps, you can reserve units following the QR link.

All exhibition and pieces texts have been written by pen by a numeric control machine created by Antigoon urban artist. At the end of the event, texts will be sanded off and the boards, which practically have not been chopped, will be reused.

Boards are poplar from European sustainable plantations.

If you are interested in having a lamp or bag at the end of the exhibition, write to [info@lucasmunoz.com](mailto:info@lucasmunoz.com) or follow this code:

