

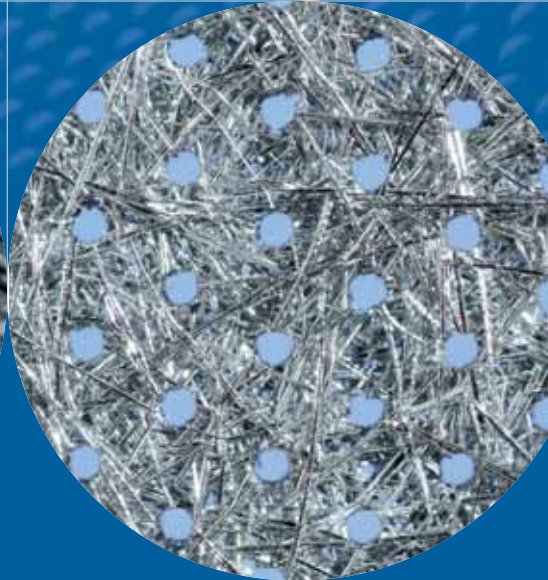
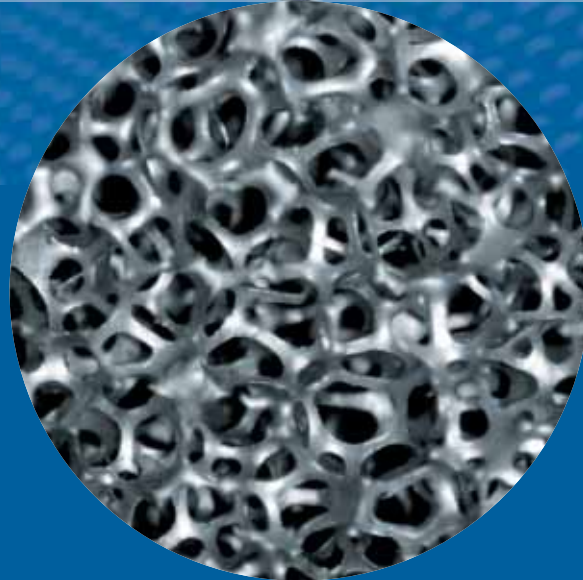
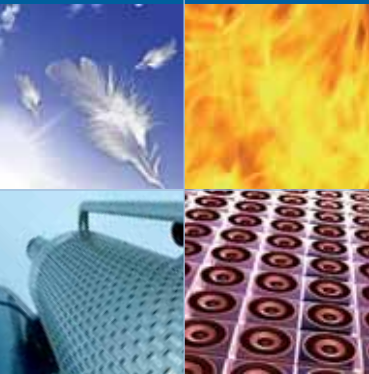
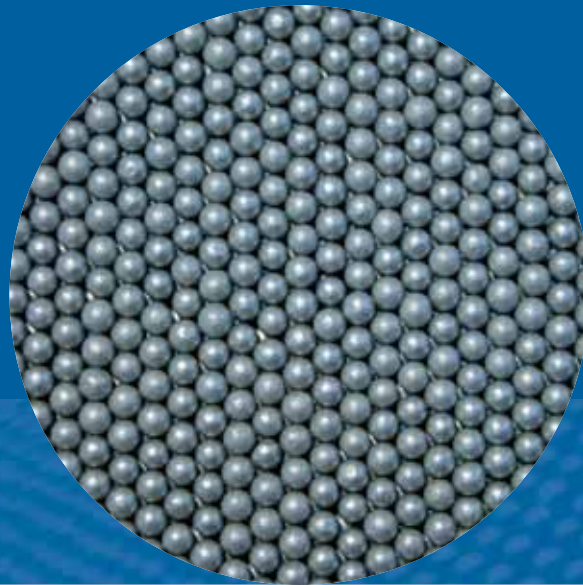


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hollomet®



Innovative cellular material.
Ingenuously multifunctional.

Simple question, great answer: hollomet® just makes more possible!

As is often the case at the beginning of a new venture, which in this case was the beginning of the **hollomet®** story, there was the simple question of: Is it still possible nowadays to “invent” a metal substance that unites a completely novel combination of characteristics? Material that allows for light-weight construction, noise reduction and catalytic processes and that, at the same time, is heat-resistant, absorbs kinetic energy and can be tailored to the customer’s needs in regards to all respects? And which, in the end, is 100% recyclable?

Intensive research and development provided the answer: **cellular material**.

Industry constantly requires a weight reduction of vehicles, machines as well as appliances, **since that can help in reducing energy reduction, emissions and costs**. Initially, cellular metallic material was developed focusing on above-mentioned criteria, whereas saving on mass is achieved through definite incorporation of porosity.

Besides a drastic reduction of mass and thus of material, which is also a way of protecting resources, a cellular composition attains further user-specific characteristics that are particularly determined by the material and the cell structure: noise absorption, thermal insulation, energy absorption, mechanical insulation, transport of material and energy or catalytic characteristics. Cellular material allows for a realization of integrated solutions that

are not only economically wise, but that also contribute to the protection of the human population and of the environment. Well, multifunctional it is!

The **hollomet®** program embraces four perfectly reproducible basic materials and each one of those four materials can take over completely different tasks. What they all have in common, however, is that they are always made the way the customer needs them.

Challenge us! We are looking forward to the opportunity of realizing user ideas tailored to your individual needs with the help of innovative cellular material!

Light-weight construction:
hollomet®



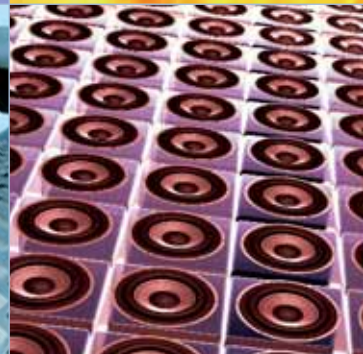
Catalysis:
hollomet®



Fireproof:
hollomet®

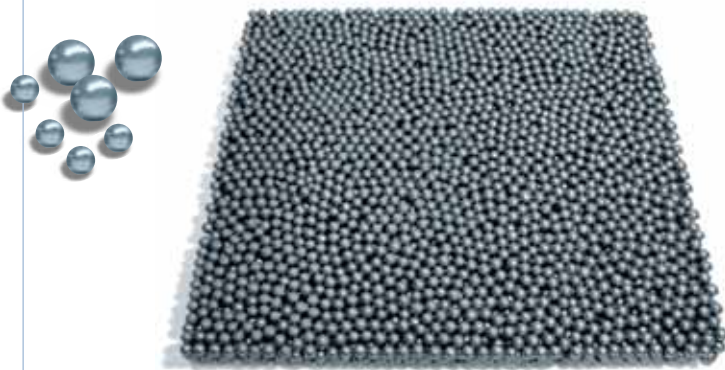


Noise protection:
hollomet®

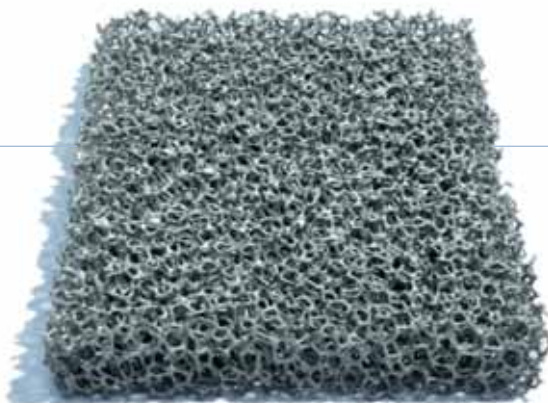


The logo for globomet, featuring the word "globomet" in a blue sans-serif font with a blue dotted arc above it.

globomet[®] – metallic hollow spheres that can be manufactured using nearly every type of material. Individually, they can be used as bulk material or they can be joined together to form any kind of structure through sintering, gluing or brazing.

The logo for globocer, featuring the word "globocer" in a brown sans-serif font with a brown dotted arc above it.

globocer[®] – hollow or solid spheres made of ceramic material that do an exceptional job in the area of catalysis. Additionally, **globocer**[®] exhibits excellent thermal and mechanic characteristics.

The logo for foamet, featuring the word "foamet" in a blue sans-serif font with a blue dotted arc above it.

foamet[®] equips open-celled structures providing a path of flow with the characteristics of metallic material – a combination that offers **enormous potential for different types of applications**.

The logo for fibomet, featuring the word "fibomet" in a blue sans-serif font with a blue dotted arc above it.

fibomet[®] is a metal fiber compound, manufactured using the melt extraction process – ideal for usage in catalysis or explosion prevention.

Light, sturdy, extremely versatile: globomet® makes lots possible.



globomet® is manufactured by coating organic material, such as styrofoam balls, followed by debinding and sintering. With this unique procedure, almost all powdery, vitrifiable material can be converted into this new cellular structure. The advantage of this material compared to similar material lays also in the high reproducibility of the structure's characteristics.

globomet® hollow spheres can be delivered as bulk material so that the customer can continue processing them or, according to the customer's needs, as a structure achieved by sintering, gluing or brazing of individual spheres. Even the construction of gradient cellular structures is possible.

Apart from a low structure density (porosity of up to 97%), globomet® is characterized by the ability of adjusting the energy absorption, which can be very well adjusted, as well as by low heat conductivity, high mechanical damping capability, excellent noise absorption and a high specific surface.

Typical dimensions of the globomet® hollow spheres:

- Diameter 1.5 – 10 mm
- Wall thickness starting at 20 µm

globomet® is suited for the manufacture of sheets, pipes, cylinders, net-shape components, etc. Sandwich structures can be realized with lots of metals and plastics, such as CFK.

globomet® can be processed the same way as any other metal material: by sawing, die-cutting, drilling, brazing, welding and cutting.

Area of application:
light-weight construction

the same time using less energy. Apart from that, even highly complex component parts can be easily realized.

Area of application: noise

globomet® does an excellent job in the area of noise absorption. In comparison to conventional material, such as mineral wool, globomet® offers a great number of advantages, e.g. in regards to staining resistance, heat resistance and sound design.



Area of application: crash-absorber

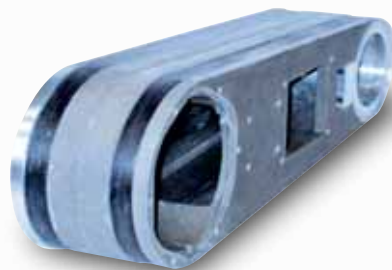
Due to the special deformation characteristics of their hollow spheres, globomet® is extremely suited to absorb kinetic energy. Crash-absorbers can be manufactured using different types of material.



4



Thanks to the enormous flexibility of the geometry as well as of the range of materials available, all structural and functional characteristics of globomet® can be adjusted to fit the customer's needs and requirements.



Little mass, highest stability: thanks to the enclosed porosity, globomet® helps in reducing weight in mechanical engineering, which allows for increasing the process velocity while at



For highest standards: globocer® – the ceramic miracle.



not participating in the processes can be made of inexpensive material, which, if necessary, improve the physical characteristics and support the catalytic processes.

Area of application: adsorber



Thanks to the adjustable diffusion ways, **globocer®** can be used as an adsorber exhibiting excellent kinetic characteristics. By doing this, we can achieve a clearly qualitative and quantitative increase of separating capacity with a significantly decreased amount of expensive active material.

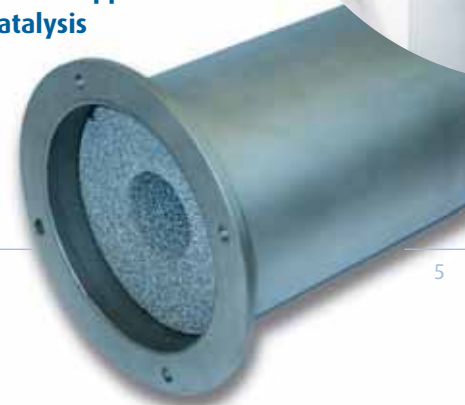
globocer® – hollow or solid spheres made of ceramic material that do an exceptional job in the area of catalysis. **globocer®** impresses through excellent thermal and mechanical characteristics. Due to its roundness and due to its narrow grain size distribution, it is especially suited for catalytic processes. Additionally, **globocer®** exhibits excellent thermal and mechanic characteristics.



The technologies developed by **hollomet®** allow for the buildup of extremely thin layers of powdery materials, which results in particular benefits: By doing this, materials developed by **hollomet®** do not only achieve an extremely high degree of reactivity, but the physical characteristics displayed are also absolutely persuasive.

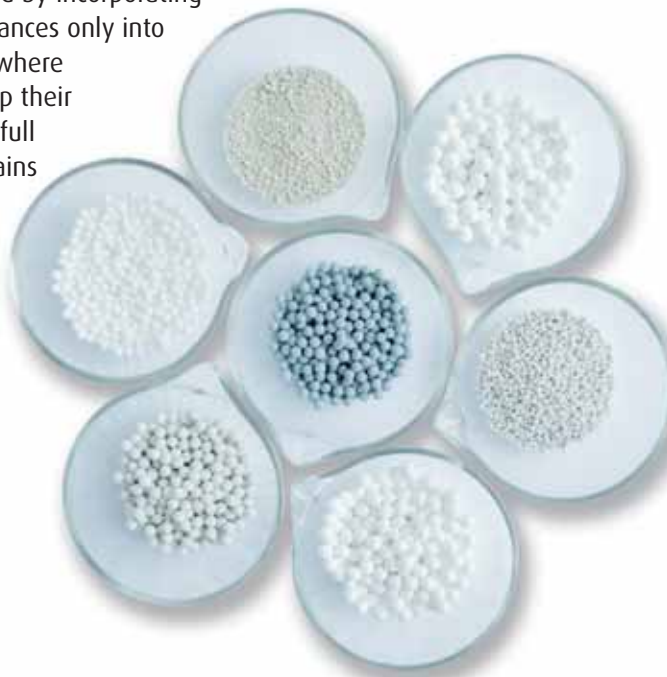
By combining different materials of nearly any thickness and density, additional pores can be created – and result in products resistant to thermal alternating loads and mechanical strain.

Area of application: catalysis



globocer® opens up the possibility of either excluding expensive material that cannot participate in the reaction, or of replacing it with a core (e.g. made of clay), which is very economic, which increases kinetics and additionally, in many cases also the selectivity. The freely adjustable sphere diameter and the very narrow grain size distribution allow for an adaption of the flow resistance.

With **globocer®**, raw material can be also protected by incorporating the active substances only into the wall areas, where they can develop their performance to full capacity. The grains of the spheres



Open for many applications: foamet® – metal foams, custom-made.

foamet



foamet® – open-celled structures providing a path of flow displaying the characteristics of metal, which allow for an expansion of the fields of application. Compared to ceramic sponges, they are characterized by excellent heat conductance and high resistance to thermal shock. The structures can be made of sinter-capable metals and alloy. The amount of pores per volume unit can be well adjusted.

During the production process, a powder-metallurgic molding procedure, an organic carrier is coated with a metal-powder/binder suspension. Afterwards, the carrier structure and the organic binder are removed during the heat treatment and the metal powder particles are sintered to achieve the finished structure.

foamet® is characterized by a high degree of permeability, a large specific surface and low specific density as well as good deformability. Using the corresponding material can therefore result in extremely corrosion- and oxidation-resistant foams.

By selecting suitable carriers in the manufacturing process, the cell width of the foams can be varied, ranging from 0.3 to 5 mm – and a porosity that is adjustable in a range from 70 – 95 %.

foamet® in practice.

Example: catalyst carrier

A catalyst carrier with a large internal surface and very low loss of pressure was desired. At the same time,



Thanks to the carriers used, coating thickness and selection of material, functional characteristics such as consistency, path of flow and heat conductivity can be adjusted to fit the customer's needs. **foamet®** can be manufactured as sheets, cylinders, pipes and often even as net-shape components.

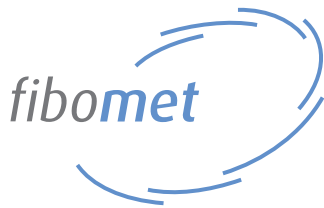
Due to the open-cell **foamet®** structure, functional applications are in the foreground, e.g. usage as filters, catalyst carrier, heat exchanger or elements for thermal insulation, but also in the medical field, such as bioanalogous bone replacement material.

a high degree of resistance to temperature, thermal shock and corrosion while at the same time exhibiting a high degree of mechanical stability was needed.

The solution was **foamet®** made of FeCrAl, available in pore size 200 – 500 µm. This material has a low counter pressure while at the same time meeting all requirements and reducing the usage of expensive precious material.



For "hot" solutions: fibomet® – the fiber does it.



fibomet® – the production process is already special: it consists of special metal fibers that are manufactured using a melt extraction process with quick solidification. Thanks to this technology, metal fibers are produced directly in the cast – a single-stage process technology for excellent uniformity and highest efficiency.

fibomet® is tailored to fit your specific needs. Even new material and material that is hard to work with can be processed into fibers. The fibers are converted into molds by using a special mechanical procedure and are sintered into highly porous structures.

fibomet® can be produced using an almost unlimited combination of material, such

- Fe-basic alloy
- Al-, Mg, Cu-, Ni-, Ti-alloys
- Intermetallics
- Metallic glasses
- Precious metal

The porosity of the fiber structures vary within a broad range up to 95% in cases of pore size of 5 to 500 µm. The gradation of the pore size in a component part is also feasible.

fibomet® can be delivered in the shape of sheets, rings and pipes:

- 400 x 400 x 1 – 15 mm (other dimensions upon inquiry)
- Rings: Ø 400 x H 50 mm
- Rings: Ø 100 x H 200 mm

**Tried and true:
fibomet® in practical experience.**

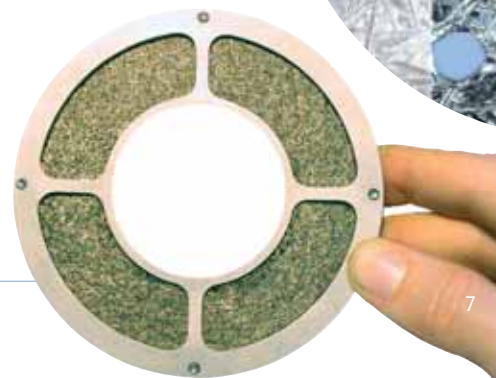
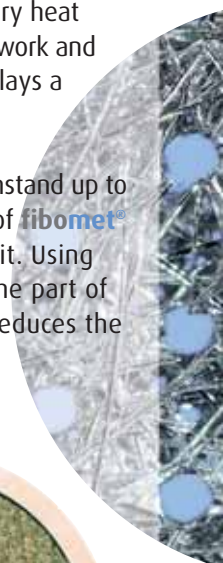
Example: burner plate

The burner plate can be used in porous surface burners. The metal fibers used for the manufacture of the **fibomet®** burner plate are made of an especially developed special alloy in order to achieve the required high life expectancy.

Example: Stirling-regenerator

The Stirling engine is a hot air motor that utilizes the difference of pressure when air heats up and cools down. In this engine, the regenerator, a temporary heat reservoir between the work and compression cylinder, plays a central role.

It has to be able to withstand up to 800° C and the usage of **fibomet®** sustainably optimizes it. Using **fibomet®** minimizes the part of the "dead spot" that reduces the degree of efficiency.



Example explosion prevention

In the explosion prevention element "Flamestop", **fibomet®** is pressed into a carrier ring, which can then be put on the drive shaft of electric motors in order to inhibit the penetration of the ignition spark.

