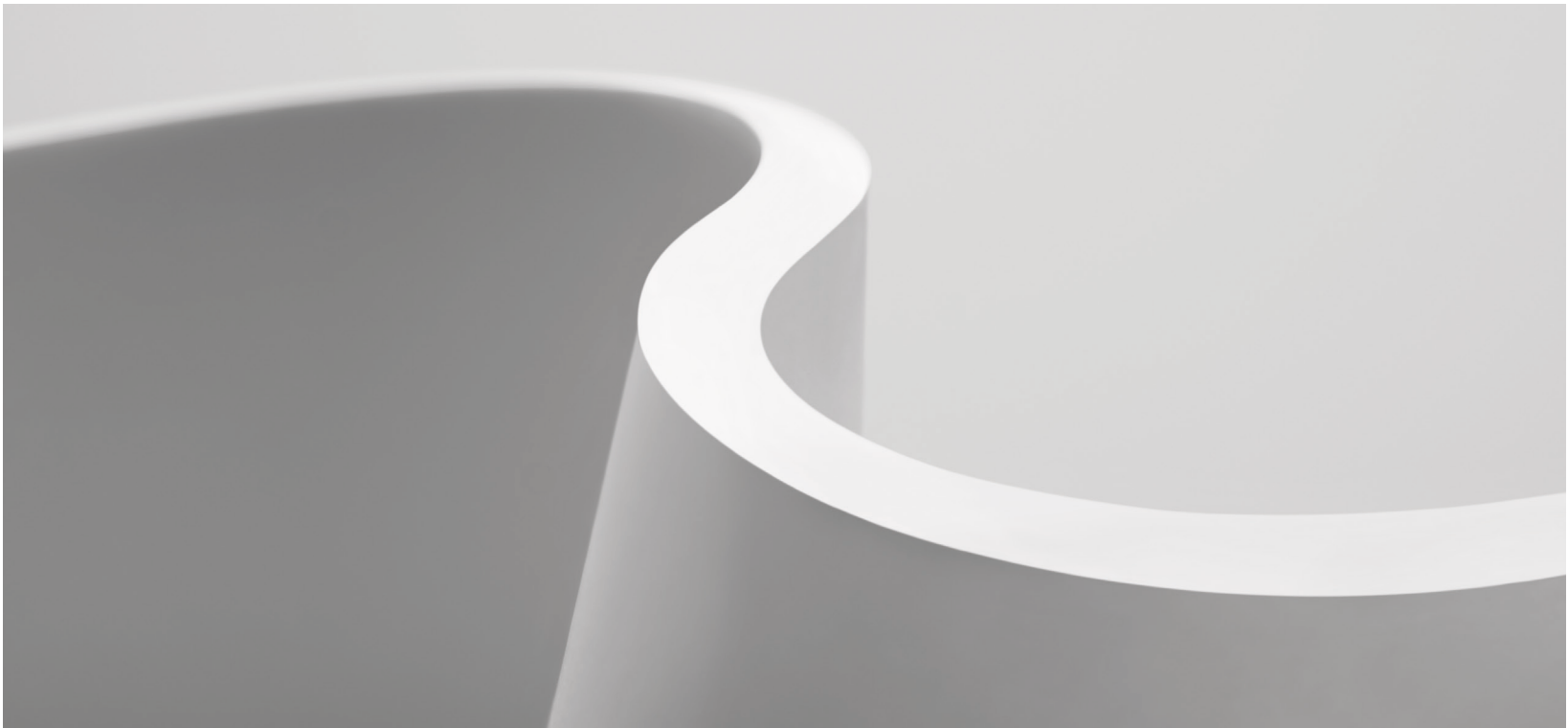


KRAHN

eMBG

PRODUCTS & SERVICE GMBH



TECHNICAL CERAMICS

PRODUCT RANGE



# KRAHN CHEMIE – A STRONG PARTNER

WELCOME TO KRAHN CHEMIE. As an independent chemical distributor and sales partner to leading producers, we know that some things are simply better together. That's why we connect markets with innovations, processors with producers and questions with solutions.

At KRAHN Chemie, you can find everything that a processor in the chemical industry values: a broad range of products from top international producers, competent technical support, labora-

tory services and logistic solutions. We share your high standards in terms of speed, flexibility and quality – and have proudly served as your strong and reliable partner for more than 100 years.

We look forward to assisting and advising you.

■ ■ ■ [ BRING IT TOGETHER ]

## ORGANIC ADDITIVES

PRODUCT GROUP	PRODUCT NAME	PRODUCER	PRODUCT DESCRIPTION
Binders	Butvar	Eastman Chemical	Binder for solvent ceramic systems. Mixture of PVAOH (Polyvinyl alcohol), PVA (Polyvinyl acetate), PA (Polyacrylat) and PVB (Polyvinyl butyral). Especially suitable for film casting. Delivery form: Powder
	Mowilith®	Celanese	Binder for aqueous ceramic systems based on PVA (Polyvinyl acetate) and PA (polyacrylate). Especially suitable for the production of RTP dry-pressing granulate. Delivery form: Liquid
Plasticizers	Jayflex™	ExxonMobil Chemical	High molecular standard and special plasticizers.
	Jayflex™ MB10	ExxonMobil Chemical	Phthalate-free, benzoate-based plasticizers.
	OXSOFT®	Oxea	Plasticizer based on Triethylene glycol Bis(2-ethylhexanoat) and Dioctyl adipate/Bis(2-ethylhexyl)adipate. Especially suitable for the improvement of flexibility of solvent and non-solvent ceramic systems. The main applications are film casting as well as injection moulding and extrusion. Delivery form: Liquid

## ZIRCONIA

PRODUCT GROUP	PRODUCT NAME	PRODUCER	PRODUCT DESCRIPTION
3YSZ – high purity	Tosoh Zirconia	Tosoh	Components which are made of 3mol% yttria-stabilized Zirconia show an excellent bending strength. Available are 3YSZ types with and without binder. Examples for applications are e.g. dental prostheses (crowns, bridges), engineering parts, design applications (watch housings, jewelry).
5YSZ – high purity	Tosoh Zirconia	Tosoh	Ionconducting components which are made of 5mol% yttria-stabilized Zirconia show an excellent bending strength. Besides 5YSZ also 4YSZ and 6YSZ are offered. The materials can be used e.g. for oxygen sensors.
Zirconium oxide – powder coloured, high purity	Tosoh Zirconia	Tosoh	Available are 3YSZ powders in black, yellow, pink and gray with and without binder, which show an excellent bending strength. Besides black and yellow, Zirconia can be offered in many different colours. Examples for applications are e.g. watches, jewelry, automotive interior components, pigmented dental prostheses (crowns, bridges).
Zirconium oxide – powder non-stabilized, high purity	Tosoh Zirconia	Tosoh	The unstabilized type TZ-0 is suited to be used as basic material for stabilized Zirconia, ATZ- or ZTA ceramics.
Zirconium oxide – powder fully stabilized, high purity	Tosoh Zirconia	Tosoh	Components with high ion conductivity can be made of 8mol% yttria fully-stabilized powders. Besides 8YSZ Tosoh also offers a 10YSZ type. The materials are used e.g. for solid electrolytes for fuel cells as well as for the production of transparent Zirconia components.
Zirconium oxide – translucency	Zpex	Tosoh	Due to the excellent translucency related to the high bending strength Zpex is especially suitable for dental applications, e.g. crowns and bridges. To achieve a natural look and different tooth colors you can mix white, yellow, pink and gray powder.
	Zpex Smile	Tosoh	Caused by the extremely high light transmittance of around 50 % Zpex Smile is especially suitable for the front teeth area. Similar to Zpex you can reach a natural look and different tooth colors by mixing white, yellow, pink and gray powder.
	Zpex 4	Tosoh	Despite the translucency from 44 - 45 % the Zpex 4 has a higher bending strength of 870MPa compared to Zpex Smile.

## INJECTION MOULDING COMPOUNDS

Zirconium oxide – coloured	Tosoh Compound	Tosoh	TOSOH Zirconia compounds are based on the proved 3YSZ TOSOH Zirconia powders and can be processed easily using injection moulding technique. The binder system can be removed thermally. The compounds can be offered in a wide range of colours. Applications are e.g. watches and automotive interior components.
Zirconium oxide – high purity	Tosoh Compound	Tosoh	TOSOH Zirconia compounds are based on the proved TOSOH Zirconia powders and can be processed easily using injection moulding technique. The binder system can be removed thermally. The compounds have $Y_2O_3$ contents of 3,5 and 8mol% and are available with and without 0,25wt% $Al_2O_3$ . Applications are e.g. watches and engineering parts.

## ALUMINIUM NITRIDE

	Toyalnite	Toyal Europe	The ALN product range includes different ALN powders, ready-to-press granulates as well as hydrophobic powders. All powders are being produced by a process of direct nitridation and therefore indicate very low impurities. Additionally, they show a very good sintering behaviour. Benefits of our ALN materials are the high thermal conductivity up to 270 W/m*K.
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## ALUMINA

PRODUCT GROUP	PRODUCT NAME	PRODUCER	PRODUCT DESCRIPTION
Aluminium oxide – purity 92 – 99,7 %	GRANALOX®	Nabaltec	The product range comprehends binder-free and ready-to-press $Al_2O_3$ with a purity of 92 % - 99 %. GRANALOX® products are based on NABALOX® products and are ready formulated ceramic materials. Binder-free GRANALOX® products are finely crushed mineral ceramic powders. Applications are e.g. ballistic protection plates and machine parts.
Aluminium oxide >99,5 % – calcined	NABALOX®	Nabaltec	The powders have an $Al_2O_3$ content of >99.5 % and are characterized by their highly consistent properties. NABALOX® aluminas are used e.g. in refractory industry, technical ceramics, catalysts and filter technology, insulator production, electrical industry and medical technology.
Aluminium oxide – purity 99,9 – 99,99 %	PKP	Shenzhen Chuge	The product range comprehends binder-free and ready-to-press $Al_2O_3$ as spray-dried and non spray-dried powders which have an $Al_2O_3$ content of 99,9 % - 99,99 %. They are used e.g. for engineering parts.
Sinter aluminium oxide – high purity	Taimicron	Taimei Chemicals	Taimicron is an ultra-fine ceramic powder with a purity of >99,99 %. Available are agglomerate-free as well as spray-dried $Al_2O_3$ powders. The sintered body shows a fine, homogeneous microstructure and is characterized by its strength and hardness. Applications are e.g. bio ceramic components and transparent ceramics.

## ALUMINIUM OXIDE TRANSITORY ALUMINAS (GAMMA PHASE)

Aluminium oxide transition	Taimicron	Taimei Chemicals	Taimicron is a high purity, ultra-fine ceramic powder. The Transition Alumina series contains gamma and theta Alumina. The particle sizes of the Transition Alumina are nanoscale with a large BET. Applications are e.g. catalysts or filler.
$\gamma$ -Aluminium oxide – purity >99,7 %	NABALOX®	Nabaltec	The soft-calcinated $\gamma$ -alumina oxide have a $Al_2O_3$ content of >99,7 %. Because of its high specific surface the soft-calcinated grades are ideally suited for the production of catalyst supports and filtration media with high porosity and low shrinkage tolerance.

## ALUMINA-ZIRCONIA

ATZ – high purity	Tosoh Zirconia	Tosoh	The powder is characterized by its fineness, its high purity as well as its good processing properties. In combination with hot isostatic pressing Zirconia components with highest bending strength can be made of types toughened with $Al_2O_3$ . Applications are e.g. the production of implants and engineering parts.
ZTA – high purity	GRANALOX®	Nabaltec	The ready-to-press GRANALOX® NM ZTA 12 consists of 88 % $Al_2O_3$ and 12 % $ZrO_2$ . Materials which are made of ZTA have a better hardness and strength compared to conventional $Al_2O_3$ -ceramics.
	Taimicron	Taimei Chemicals	The ZTA powders are based on the powder type TM-DA or TM-DAR of Taimei Chemical Co., Ltd. and contain 16wt% respectively 20wt% Zirconia. The ZTA powders are available with and without binder. The products with binder are ready-to-use and can be pressed without any further processing.

## MULLITE

PRODUCT GROUP	PRODUCT NAME	PRODUCER	PRODUCT DESCRIPTION
	SYMULOX®	Nabaltec	SYMULOX® M72 is a synthetic sintered mullite. The sintered mullite is characterized by its outstanding homogeneous composition, low contamination and good crystallinity. The material shows a high fire resistance, high strength with low thermal expansion and excellent thermal shock resistance.

## CEMENTLESS BINDER BASED ON ALUMINIUM OXIDE

	NABACAST®	Nabaltec	The NABACAST® is an innovative, cementless binder based on reactive aluminas. Products of the NABACAST® group fulfill several tasks in refractory concrete. They act as binder, microfiller and deflocculant.
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## SPINEL

	Taimei Mg-Al-Spinel Powder	Taimei Chemicals	The spinel powder has a high purity, is binder-free and is based on Mg-Al spinel. Examples for applications are high-strength, transparent ceramic components.
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## TITANIUM DIOXIDE

	Hombikat	Venator	Anatase titanium dioxide powder has a purity of 95 %–99 %. The materials are used e.g. in refractory industry, catalysts, electro ceramics, glazes, glas, aluminium titanate.
	Hombitan	Venator	Anatase titanium dioxide powder has a purity of 98 %–99,7 %. The materials are used e.g. in refractory industry, catalysts, electro ceramics, glazes, glas, aluminium titanate.
	Sachtleben	Venator	Rutil titanium dioxide powder has a purity of 99 %–99,5 %. The materials are used e.g. in refractory industry, catalysts, electro ceramics, glazes, glas, aluminium titanate.

## CERAMIC GRINDING MEDIA

Aluminium oxide	Alumina Grinding Media	Tosoh/Nikkato	Alumina Grinding Media have a purity of 92 %–99,9 %. Applications are e.g. electronics, pharmaceutical, food industry, catalysts and coatings.
Aluminium oxide – high purity	Taimei HP Alumina Beads	Taimei Chemicals	The Alumina Grinding Media are characterized by a high wear resistance and corrosion resistance as well as a high purity of >99,99 %. Applications are e.g. electronics, pharmaceutical, food industry, catalysts and coatings.
Silicon nitride grinding media	SUN	Tosoh/Nikkato	Silicon Nitride Grinding Media have a purity of 90 % Si <sub>3</sub> N <sub>4</sub> . Applications are e.g. electronics, pharmaceutical, food industry, catalysts and coatings.
Zirconium oxide – high purity	YTZ®	Tosoh/Nikkato	YTZ® Grinding Media are made of YSZ. They have a higher density which provides a greater impact force resulting in superior grinding efficiency. Additionally, they have a high purity, a smooth surface, almost perfect roundness and higher wear resistance. Applications are e.g. electronic materials and catalyst materials.

## SURFACE FINISHING MEDIA

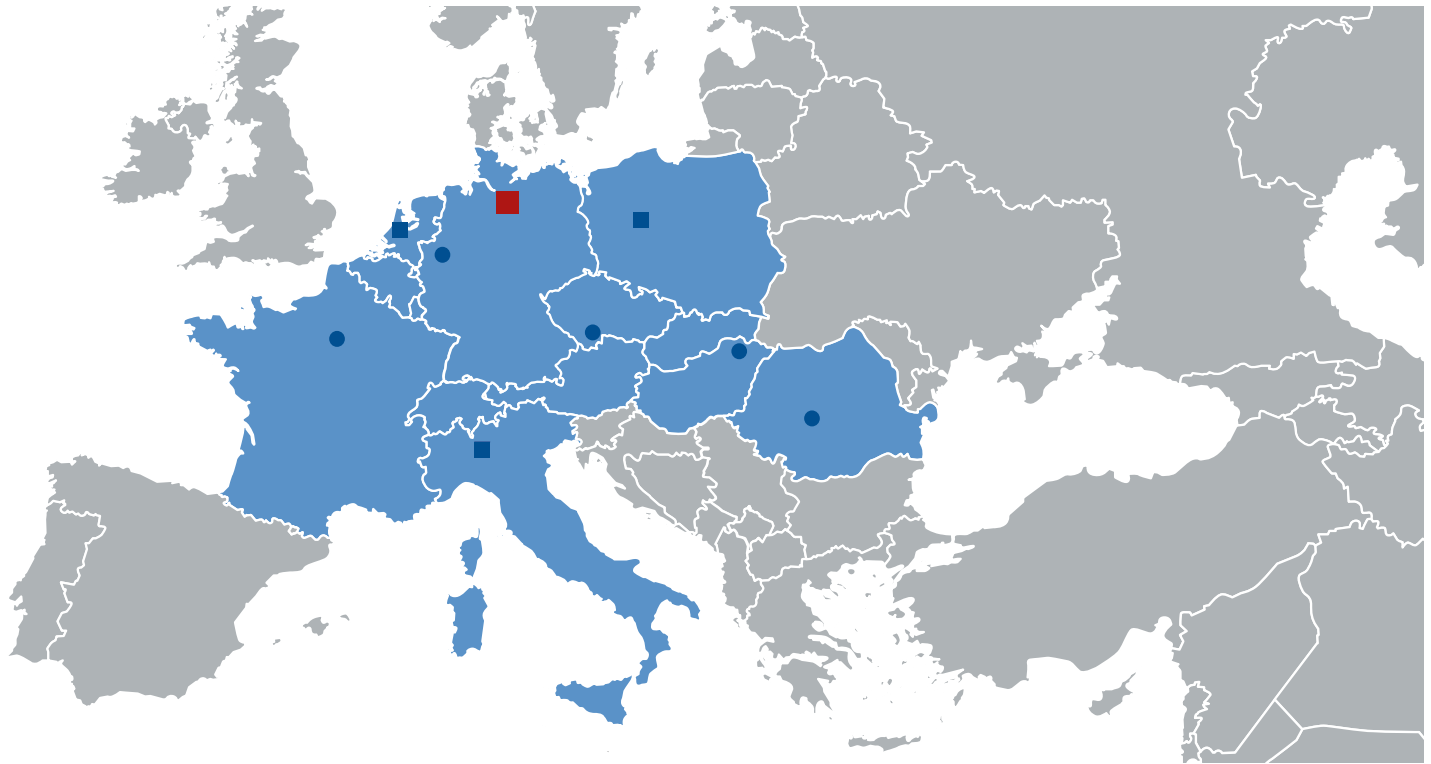
PRODUCT GROUP	PRODUCT NAME	PRODUCER	PRODUCT DESCRIPTION
Dry finishing	Corn granulates	Otec	This granulate is impregnated with a special polishing powder so that no further polish is needed for the first 3–4 batches.
	Dry grinding granulates	Otec	Several granulates e. g. on basis of polyurethane with SiC or of corundum are deliverable.
	Dry grinding pastes	Otec	These dry grinding pastes are mainly used together with walnut shell or corn granulates in the dry grinding process. However, stock removal rates are considerably lower than with wet grinding media. They are mainly used for deburring workpieces with a minor amount of burring or for smoothing after wet grinding in order to prevent the orange peel effect.
	Grinding oils	Otec	Used together with walnut shell or corn granulates and polishing powders. The grinding oil creates a bond between the substrate and the polishing powder. The grinding oils are also suitable for regreasing dried-out granulate and for binding dust, e. g. when using HSC granulates.
	Plastic polishing chips	Otec	These media are used for the dry polishing of jewelry. Their consistent geometry prevents any dust from forming, a key factor in this area. Typical application: jewelry industry; especially suitable for finishing silver jewelry, highly suitable for hollow items, lobster clasps and curb chains.
	Polishing pastes	Otec	Polishing pastes and powders which are mainly used with walnut shell or corn granulates in the dry finishing process. The pastes give high-quality surfaces and good protection against corrosion. The powders which are always used together with adhesive oils or greases, give high-quality, smooth, mirror-finish surfaces.
	Walnut shell granulates	Otec	Granulates impregnated with a polishing paste so that no further polishing paste need be added for the first 3–4 batches. Also can be supplied unimpregnated, then must be impregnated with a grinding or polishing powder before it is first used.
Wet finishing	Ceramic abrasives	Otec	Ceramic-bonded abrasives with a high density and hard substrate are used mainly for grinding steel alloys.
	Compounds	Otec	Compounds are added to the disc finishing machines during the grinding process in order to produce clean, bright and non-corroded workpiece surfaces. With impact-sensitive workpieces, the compound creates a foam buffer between the workpieces and the abrasive media.
	Microfinishing media	Otec	Fine-grained abrasive made from sintered ceramic with very high density and highly wear resistant. Suitable for polishing and fine grinding workpieces in hardened steel.
	Plastic grinding chips	Otec	These high-quality grinding chips offer high stock removal rates and a fine surface finish. Their soft bond prevents any hardening of pitting of the workpiece surface.
	Spherical zirconia	Otec	No material is removed during processing. The surface is merely smoothed and compacted. Very hard and therefore long-lasting. Very good polishing properties. Highly recommended for use in vibrators (in the jewellery industry).
	Stainless steel media	Otec	No material is removed during processing. The surface is merely smoothed and compacted.
	Wet grinding pastes	Otec	Used especially together with ceramic polishing media. Improves the grinding effect with wet grinding and is also suitable for roughing blunt abrasive media.

## BINDER SYSTEMS FOR INJECTION MOULDING/EXTRUSION

PRODUCT GROUP	PRODUCT NAME	PRODUCER	PRODUCT DESCRIPTION
Aqueous debinding	Embemould® K83/84 G	eMBe	Binders for thermoplastic processing of metal and ceramic powders into sintered moulds. Combination based on polymers with water soluble components.
Catalytic debinding	Embemould® CAT/CAT C	eMBe	Binders for processing of metal and ceramic powders into catalytic debinderable thermoplastic moulding compounds based on POM.
Solvent debinding	Embemould® M/KCR	eMBe	Binders for thermoplastic processing of metal and ceramic powders into sintered moulds. Combination based on polymers which can be solved by solvents (e.g. acetone, ethanol).

### Product Disclaimer

1. Any information given on the chemical and physical characteristics of our products, including technical advice on applications whether verbally, in writing or by testing the product, is given to the best of our knowledge. However, this information is given without obligation and does not exempt the buyer from carrying out own investigations and tests in order to ascertain the product's specific suitability for the purpose intended. The buyer is solely responsible for the application, utilisation and processing of the products and must observe the laws and government regulations and the consequential rights of any third party. Any exception of the above-mentioned restrictions requires the manufacturer's express release in writing.
2. The products sold and/or supplied by us are not destined for the manufacture (i) of medical devices according to EU directive 93/42/EEC, in particular of implants, (ii) of biocides, (iii) of pesticides, (iv) of human and veterinary pharmaceuticals, (v) of food and feed products, (vi) of cosmetics, (vii) of weapons or other objects, designed to take human life or causing injuries.
3. At all times our Conditions of Sale apply.
4. Our product lists include dangerous goods. The correct marking of such goods is described in the respective datasheets.



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06/2019