

Baikowski<sup>®</sup> 



Solution partner for  
**FINE MINERALS**

## **SUPERIOR INTERMEDIATE & FINAL POLISHING**

FINE ALUMINA, SILICA, CERIA  
& DIAMOND SOLUTIONS





> In today's high-precision industries, achieving perfect surfaces quickly and effectively remains a continual challenge.

> Baikowski slurries are engineered with **optimized particle size distribution, crystallinity, and specific surface area** enabling optimized polishing to achieve precision and efficiency in intermediate and final polishing processes.

Baikowski slurries strike the critical balance of surface finish and removal rate. Our pH optimized slurries are used across a wide variety of substrates including oxide layers, ceramic, crystal, metal, plastic, and glass.

> Whether in automotive, optics, electronics, jewelry, metallography, or aerospace, our innovative solutions are designed to enhance the performance, reliability, and aesthetics of your final products.

- 1- Baikowski® Polishing Solutions
- 2- Polishing Techniques
- 3- Main Applications
- 4- Polishing Solution Key Properties
- 5- Polishing Solution Selection Guide
- 6- Main Alumina Baikalox® polishing powders & slurries
- 7- Polishing Pads
- 8- Related Blog Posts

# 1. Baikowski® Polishing Solutions

## > Alumina

Our alumina solutions are suitable for a wide range of substrates, including metal, ceramic, YAG, sapphire, and other crystal. They are commonly used in intermediate and final polishing stages to achieve precision surfaces.

## > Silica

Commonly used for certain plastics and other soft materials such as gold, our silica slurries are effective for intermediate or final polishing of optical components, semiconductors, as well as optical lenses, LCD panels, and other precision surfaces.

## > Ceria

Our premium range of ceria slurries is proven for polishing highly demanding semiconductor layers and precision optical components. We also produce other ceria slurries for the initial polishing of glass and ceramic.

## > Diamond

Diamond is the abrasive of choice for rough polishing of super hard materials such as AlTiC, GaN,

SiC, ceramics and some metals. It is also effective for intermediate polishing of hard substrates or even for high-precision finishing.



## 2. Polishing Techniques

### > Mechanical Polishing (MP)

This technique utilizes abrasive particles to physically wear down and smooth the surface, without chemical assistance.

### > Chemical Mechanical Polishing (CMP)

CMP combines chemical reactions with mechanical abrasion to achieve superior surface finish and planarity.

## 3. Main Applications



In various industries, the choice of polishing solutions, along with precise control of process parameters, directly impact the manufacturing efficiency and quality of the final products, such as in the following :

### > Metallographic polishing with Surface Preparation

Our advanced solutions effectively remove surface scratches and deformations, delivering a high-quality finish that meets the strict requirements for accurate microstructural analysis.

With aluminium and copper, Baikowski®'s fine alumina solutions have proven efficiency in metallography coupled with polishing advantages such as process time and ease of cleaning over that of traditional colloidal silica products.

### > Automotive sector with Aesthetic Appeal

For high-end automotive applications, our alumina car polish solutions remove surface imperfections, scratches, delivering a high-gloss and reflective finish and streamlining the polishing process.

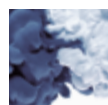
### > Semiconductor industry with Planarity

Achieving a flat surface free of defects and minimum surface roughness are crucial for photolithography steps in semiconductor multilayer structures. CMP with proper oxides and formulation ensures the necessary planarization for accurate layer patterning.

### > Optic & Photonic fields with Optical Clarity

Finishing and kiss-polishing enable customers to achieve the optical clarity required for photonic components such as lenses, mirrors, and waveguides. A smooth and defect-free surface are essential for minimizing light scattering, maximizing the wear resistance and the performance of photonic devices.

*Thanks to a more uniform and controlled removal rate, our particles can reduce the time required for achieving the desired surface finish.*





## 4. Polishing Solution Key Properties: Grain Morphology, Particle Size and Particle Size Distribution (PSD)

### Optimized Powders & Slurries through Advanced Particle Engineering

Our milled/unmilled powders and slurries are fine-tuned to enhance your polishing processes and delivering results, by focusing on three core performance pillars:

#### > Abrasive Action for Material Removal

Our Alumina ( $\text{Al}_2\text{O}_3$ ), silica ( $\text{SiO}_2$ ), ceria ( $\text{CeO}_2$ ), and diamond (C) particles are designed to deliver the precise mechanical force needed to efficiently remove material and create smooth surfaces.

**The crystallinity and grain morphology are optimized** to balance removal speed and surface precision, ensuring high efficiency across various applications.



#### > Surface Finish Quality

Achieving a consistent smooth and scratch-free finish require **fine particles with controlled size and a narrow particle size distribution.**

Our solutions are engineered to meet specific surface finish requirements across a wide range of substrates.

#### > Chemical Reactivity and Selectivity

Certain abrasives, such as ceria, not only act mechanically but also chemically interact with the substrate to boost polishing efficiency.

This dual-action approach improves the selectivity of material removal and the quality of the final surface.

**The superior dispersion capability of our slurries, combined with a narrow distribution of fine grains** provide better control over selective removal of material layers in CMP processes.

*Baikowski® designs ready-to use powders and slurries with controlled particle size and PSD.*

*Customized solutions can also be developed upon request, with adjustments to chemical composition and purity, physical characteristics, particle shape, and formulation.*



## 5. Polishing Solution Selection Guide

> This guide provides a general overview of our powders and ready-to-use slurries in terms of:

- **Types of Abrasives:** Categorized based on the substrate to be polished.
  - Ceramics & Crystals
  - Metal
  - Film Forming Materials
  - Glass & Plastics
- **Removal Rate (RR)\***
- **Surface Finish Quality (SFQ)\*\***

\* Good \*\* Excellent



Ceramics & Crystals	Powders					Slurries			Attribute			
	Substrates	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	RR	SFQ	Other			
Sapphire		X	X					*				
Al <sub>2</sub> O <sub>3</sub>			X			X	**	**				
Alumina Nitrate / ALN		X					**	**	Low shedding			
AlTiC						X	**	*				
Calcium Fluoride CaF <sub>2</sub>	X		X			X	**	*				
CZT	X						**	**				
GaN						X		*				
Lithium Niobate / LT			X				**	*				
Lithium Niobate / LN			X				**	*				
SiC	X	X				X		*				
YAG	X					X	**	*				
ZnSe & Crystals	X						**	**				

This is **not an exhaustive list** and there are several factors to consider when choosing polishing abrasive solutions, starting with your **specific application and desired results**.

> This guide also provides additional details on Baikowski®'s core alumina polishing products to help you initiate a discussion with us.





Metal	Powders		Slurries			Attribute		
	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	•RR	••SFQ	Other
Substrates	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	•RR	••SFQ	Other
Aluminum / Al	X	X					*	Easy cleaning
Copper / Cu	X	X					*	Easy cleaning
Germanium / Ge	X	X			X	**	*	
Molybdenum / Mo		X					*	
Tungsten	X					**	**	
Stainless Steel / Fe	X	X				**	*	

Film Forming Materials	Powders		Slurries			Attribute		
	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	•RR	••SFQ	Other
Substrates	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	•RR	••SFQ	Other
Metal Film	X	X	X				*	Low corrosion
Oxide Layer			X				*	
SiO <sub>2</sub> Layer			X	X		**	*	

Glass & Plastics	Powders		Slurries			Attribute		
	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	•RR	••SFQ	Other
Substrates	Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub>	SiO <sub>2</sub>	CeO <sub>2</sub>	Diamond	•RR	••SFQ	Other
Blue Glass	X	X				**	*	
Glass / SiO <sub>2</sub>	X	X		X		**	*	
PMMA	X					**	**	
Polycarbonate		X				**	*	
Varnish & Lacquers	X	X					**	

> We also offer support and guidance on polish test measurements using our advanced equipment, ensuring precise assessment of **surface roughness, roughness average (Ra), and peak-to-valley (P-V) metrics** to meet your specific requirements.

> For all your question on Baikowski®'s high-quality polishing solutions and **fine-tuning ability** (media, viscosity, pH control and beyond...), [contact us](#).



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# 6. Main Alumina Baikalox® polishing powders & slurries

## > Our portfolio of polishing solutions

Our alumina powders and slurries are meticulously engineered to address each phase of the polishing process:

- **Rough or Initial Polishing:** This coarse polishing stage removes a significant amount of material to achieve a flat surface, often leaving behind scratches that need to be removed in subsequent steps.
- **Intermediate Polishing:** This step smooths out the scratches from rough polishing and begins to refine the surface, preparing it for the final polish.
- **Finishing or Final Polishing:** This step achieves the smoothest and most defect-free surface possible. In this final stage, **Kiss Polishing**, critical for optical clarity and high-precision applications is also used to describe a very gentle polishing method that removes the last traces of surface defects without significantly altering the surface geometry.

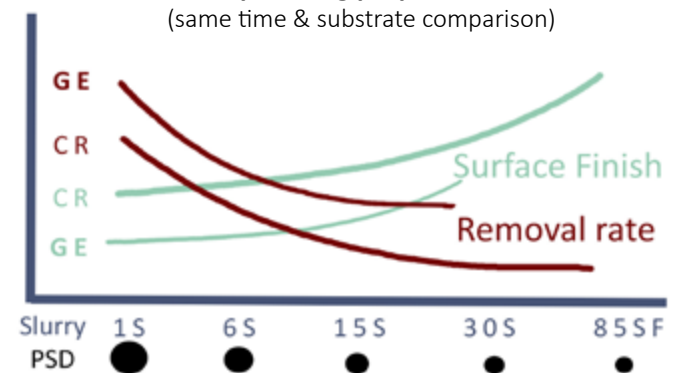
Our know how in fine oxide materials, characterized by precisely **controlled particle size**, give us a particular advantage to achieve **superior surface refinement and defect reduction** in the intermediate and final polishing phases.

## > Baikalox® alumina polishing slurries

They are designed using Baikowski®'s ultra-pure alumina. Our formulations offer a **stable suspension** in a neutral, non-toxic base that remains moist on the lap or polishing pad, ensuring consistent performance.

The base is fully **water-soluble** and **non toxic**. These suspensions are ideal for applications where **ease of use and material conservation** are priorities. For those who prefer, powders are also available upon request.

### Illustration of the principle of GE & CR slurry polishing properties



Polishing Slurries (Typical values)	Main substrate tested	Polishing step	Nominal particle size (µm)	pH	Slurry density (g/cm <sup>3</sup> )	PSD (µm) d <sub>50</sub>
<b>GE1S</b>	Metal, Crystals & ceramics	Rough	3.0	7-8	1.2	13
<b>GE6S</b>	Metal, Crystals & ceramics	Rough Intermediate	1.0	7-8	1.2	8.0
<b>GE15S</b>	Metal, Crystals & ceramics, varnish & lacquers	Intermediate	0.3	7-8	1.2	4.5
<b>CR1S</b>	Metal, Glass & lens, Crystals & ceramics	Rough	3.0	7-8	1.2	1.0
<b>CR6S</b>	Glass & lens, Metal	Rough Intermediate	1.0	7-8	1.2	0.5
<b>CR15S</b>	Glass & lens	Intermediate	0.3	7-8	1.2	0.2
<b>CR30S</b>	Metal, YAG, Glass & lens	Finish	0.1	7-8	1.1	0.2
<b>CR85SF</b>	Glass & lens	Kiss polishing	0.05	7-8	1.1	-





## > Baikalox® alumina polishing powders

They are controlled in:

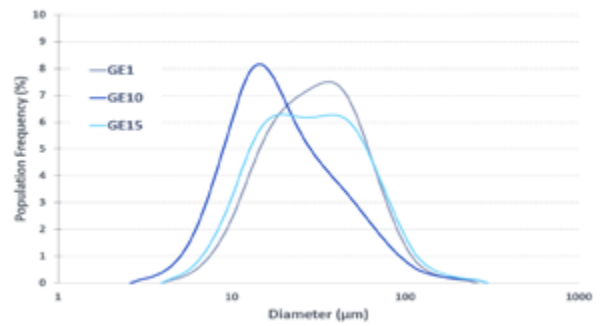
- Particle size & particle size distribution (PSD)
- Chemical purity (3N, 4N and beyond)
- Crystals & Crystalline phase
- Specific surface area (wide range of SSA available)
- Morphology

## > Application examples

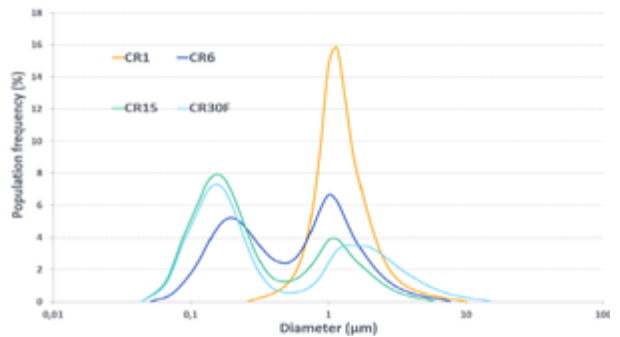
- Metallographic sample preparation
- Hard contact lens polishing
- Electro-optic, laser Crystals & ceramics finishing
- Optical mold polishing
- Fiber optics
- Lapidary and mineral polishing
- Plastic finishing

More details on [Baikowski®'s polishing solutions](#)

## > Particle size distribution of the GE range



## > Particle size distribution of the CR range



Polishing Powders (Typical values)	Main substrate tested	Polishing step	Crystalline phase % $\alpha/\gamma$	SSP (m <sup>2</sup> /g)	Harness Mohs	* PSD ( $\mu\text{m}$ ) $d_{50}$
<b>GE1</b>	Metal, Crystals & ceramics	Rough	100	< 3	9	13.5
<b>GE6</b>	Metal, Crystals & ceramics	Rough Intermediate	100	5.2	9	8
<b>GE15</b>	Metal, Crystals & ceramics, varnish & lacquers	Intermediate Finish	90/10	14	9	5.5
<b>GE30</b>	Varnish & lacquers, metal	Intermediate	80/20	25	9	4.5
<b>BA105</b>	Glass & lens	Finish	10/90	97	9	2.5
<b>CR1</b>	Metal, Glass & lens, Crystals & ceramics	Rough	100	3	9	1.0
<b>CR6</b>	Glass & lens, Metal	Rough Intermediate	100	6	9	0.5
<b>CR10</b>	Soft lens, PMMA	Rough	100	7.1	9	0.2
<b>CR15</b>	Glass & lens	Intermediate	90/10	15	9	0.2
<b>CR30F</b>	Metal, YAG, Glass & lens	Finish	80/20	26	9	0.2
<b>BRA105</b>	Glass & lens	Finish	10/90	100	9	1.0



\*Laser Diffraction



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# 7. Polishing Pads

> **Baikowski® offers a range of polishing pads**

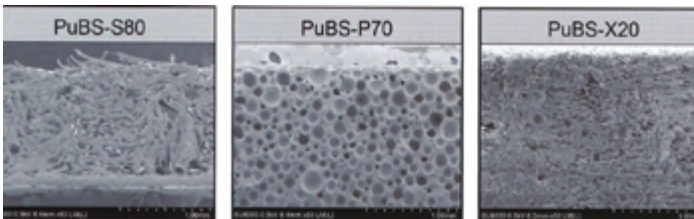
They are optimized for various applications, including metals, sapphire, other crystals and ceramics.

Each pad is meticulously designed to work seamlessly with Baikowski® polishing slurries, ensuring optimal performance. The recommended pad varies based on the desired roughness and flatness of the finished product. The list below **is not exhaustive**.

For personalized assistance with pad selection, [contact us](#).



**SEM**



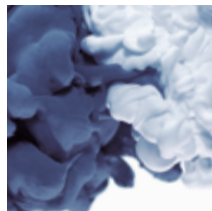
Polishing Pads (Typical values)	Applications	Type	Thickness (mm)	Hardness (") Askker A	Color
<b>PuBS-S80</b>	Sapphire C plane SiC, LN, LT, AlN	Non-woven	1.3	85	White
<b>PuBS-P70</b>	Sapphire C & A plane SiC, Metal	Polyurethane	1.3	75	White
<b>PuBS-x20</b>	Sapphire C plane	Non-woven	1.8	75	Sky blue
<b>PuBS-kso</b>	ISiC, Metal	Non-woven	2-5 (on request)	62	Gray
<b>PuBS-w19</b>	Metal, Glass	Suede	0.95	67	Black

# 8. Related Blog Posts

- > [Sapphire Polishing: Superior Oxide Solutions for The Optics, Electronics, Watchmaking & Semiconductor Industries](#)
- > [Metallography: Superior Finishing Polishing with Fine Alumina vs. Colloidal Silica for Soft Metals](#)
- > [Car Polish: Alumina Solutions for Faster and High-Gloss Varnishes & Lacquers Polishing](#)
- > [Medical Applications: Baikowski’s Oxide Solutions ranging from Bioceramics to Finishing Polishing](#)



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