



# Polishing Slurry

PRODUCT CODE

## SPH SERIES

**Sapphire** is the single crystal used for various application utilizing **superior strength and hardness**. Recently production of sapphire wafers were drastically increased due to two new markets such as substrates for **LED and mobile phones**.

### Main applications



Sapphire polish

In order to follow market volume and price request, improvement of productivity is highly requested. Polishing of sapphire is generally done by diamond followed by colloidal silica final step and it needs long time. Baikowski developed innovational polishing slurry and achieved drastic improvement of productivity by using the same polishing tools and conditions.

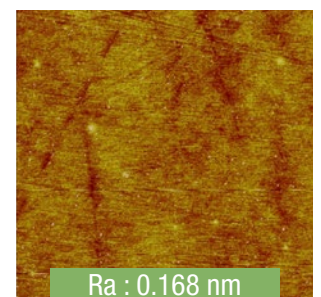
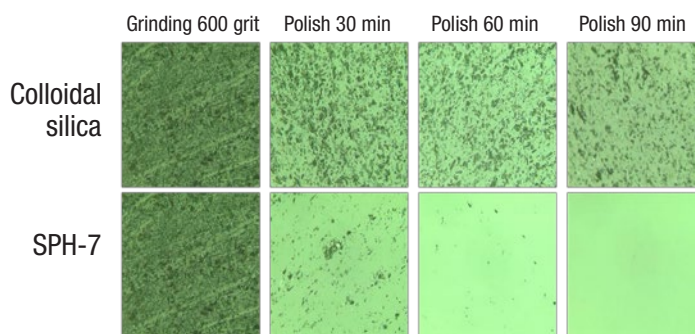
### Alumina base slurry

**SPH alumina slurry** series is unique CMP slurries based on the patented chemical formulation showing 3-4 times quicker removal rate for sapphire C plane compared with traditional colloidal silica slurry.

#### SPH-7 slurry

**SPH-7 slurry** was first developed type obtaining finest surface roughness among SPH series alumina slurries.

## POLISHING SURFACE OBSERVATION



Ra : 0.168 nm

## POLISHING CONDITION

Machine	φ 610 mm single side
Plate rotation	50 rpm
Down force	400 g / cm <sup>2</sup>
Slurry flow	100 ml / min
Work	Sapphire C plane 4"

Typical values are given by Baikowski as an indication only. Such values are not contractual.

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### SPH-9D slurry

Because of SPH-7 slurry is alumina bases slurry, it causes sedimentation and continuous stirring is requested during polishing.

SPH-9D is secondary released type improving suspend ability and has about 20 % higher removal rate than SPH-7.

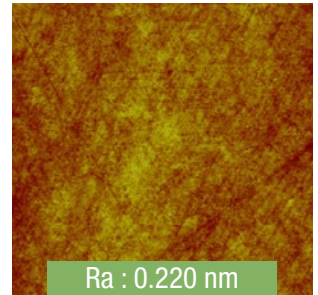
SPH-9D also has slightly higher viscosity and suitable for dual face polishing operation.

### SPH-10 slurry

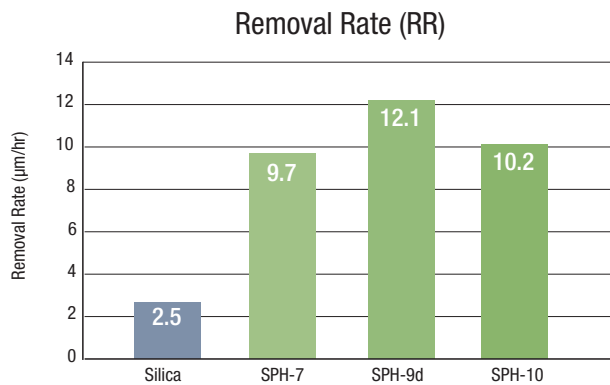
SPH-10 slurry is latest released and improved type based on SPH-9D slurry.

SPH-7 and 9D slurries are normally used with circulation use and removal rate is decreased batch by batch due to de-formulation of chemical. Periodical addition of new slurry is requested to keep initial removal rate.

Baikowski developed new chemical formulation and succeeded to improve durability of removal rate. SPH-10 shows more stable removal rate batch by batch and keeps more than 80 % removal rate for 2 times batches than SPH-7.



### Comparison of SPH-7, 9D and 10 slurry



### SURFACE ROUGHNESS

SPH-7	SPH-9D & SPH-10
≤ 0.2 nm	0.2 nm - 0.35 nm

### SLURRY FORMULATION

Products	D50(µm)	pH	Dilution
SPH-7	0.25	12.5 – 13.5	1 : 2
SPH-9D	0.30	12.5 – 13.5	1 : 2
SPH-10	0.30	12.5 – 13.5	1 : 2

### PACKAGE



4 KG plastic bottle  
20 KG plastic pail

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## Colloidal silica base slurry

Super surface finish can be obtained by using SPH colloidal silica based slurry. Baikowski colloidal silica has various advantages compared with traditional colloidal silica.

### SPH-51 slurry

SPH-51 slurry has higher removal rate for sapphire C plane compared with traditional colloidal silica and obtains super surface finish requested by the high end LED.

SPH-51 also shows high removal rate for sapphire A plane especially combination with polyurethane pad.

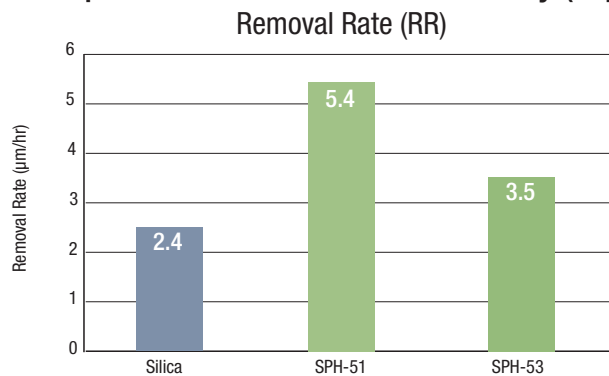
### SPH-53 slurry

SPH-51 slurry has superior removal rate, however, causes higher temperature and more torque during polishing operation and cannot be used depend on application and polishing tools especially dual face polishing machine.

SPH-53 shows intermediate removal rate between traditional silica slurry and SPH-51 and the same temperature and torque as traditional silica.



## Comparison of SPH-51 and 53 slurry (C plane)



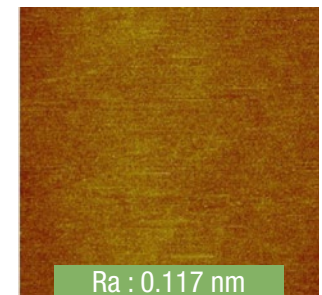
## POLISHING CONDITION

Machine	φ 610 mm single side
Plate rotation	50 rpm
Down force	280 g / cm <sup>2</sup>
Slurry flow	100 ml / min
Work	Sapphire C plane 4"

## Surface roughness



SPH-51



SPH-53

Measured by AFM (10 µm X 10 µm area)

## TEMPERATURE & TORQUE

Products	Temperature ( °C )	Torque (%)
Traditional silica	36	100
SPH-51	47	139
SPH-53	35	94

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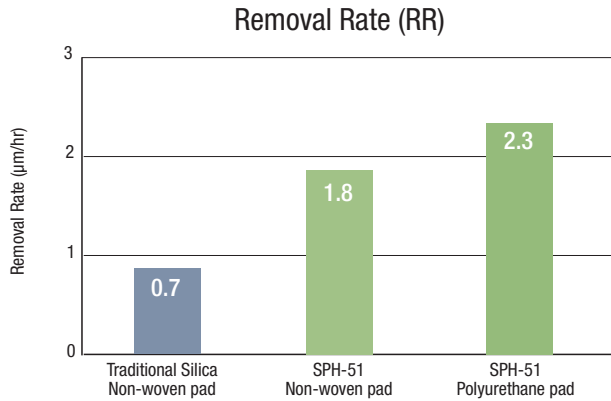


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## Performance of SPH-51 (A plane)



## Surface roughness



## POLISHING CONDITION

Machine	φ 610 mm single side
Plate rotation	50 rpm
Down force	280 g / cm <sup>2</sup>
Slurry flow	100 ml / min
Work	Sapphire A plane

## PACKAGE



20 KG plastic bag  
in box

## SLURRY FORMULATION

Products	D50(nm)	pH	Dilution
SPH-51	100	10 – 11	1 : 2
SPH-53	70	8 – 9	1 : 2

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