

SOL9390 Series



SOL9390
> +0.1 %
Eta gain

efficiency

Patent Pending

N-TYPE FRONT-SIDE PASTE



New Generation N-Type Front Side Paste

- Better contact resistivity for high Rsheet
- Low metal induced recombination leading to higher Voc
- Improved printability / line uniformity

As the P-type cell is getting closer to its efficiency limit, PV industry generally turns its attention to the N-type cell with higher efficiency potential. In recent years, the N-type cell has demonstrated its advantages over the P-type cell in efficiency in many fields, especially in the N-type TOPCon (Tunnel Oxide Passivated Contact) cell.

Heraeus has supported this effort for over five years with the development and mass production of our SOL9350, SOL9360, SOL9370 and SOL9380 series pastes. Heraeus continues to innovate through investments in R&D and has developed pastes with greater performance for n-type cells.

The Heraeus SOL9390 is our newest N-type paste for p+ emitter surfaces. In conjunction with our pastes for n+ emitter surfaces, beta test customers have demonstrated higher cell efficiencies with better contact to the cell's boron emitter.

KEY BENEFITS

- Better contact resistivity for high Rsheet
- low metal induced recombination leading to higher VOC
- Improved printability / line uniformity
- Co-fireable with Heraeus n+ surface paste
- Wider firing window
- Higher green strength
- Compatible with Double and Dual printing

HIGHER CELL PERFORMANCE

Heraeus' SOL9390 Series is our newest front-side metallization pastes for N-type cell designs with p+ emitter surfaces. The performance of this series of pastes is an improvement over our industry leading SOL9380 Series. Test results show that SOL9390 Series has significant improvement in cell VOC while maintaining or improving FF characteristics comparing to SOL9380.

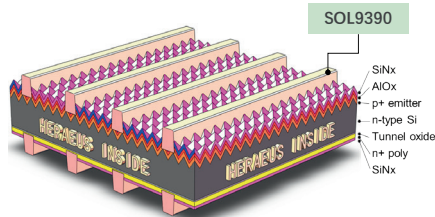


Fig1.SOL9390A used on N-TOPCon frontside

Paste	Finger	Reference	SOL9390
Printing	Deposit (mg)	-	-5mg
	Fired L.H. [um]	-	+0.2
	Fired L.W. [um]	-	-2.9
I-V	Eff. (%)	-	+0.09
	Voc (mV)	-	+0.9
	Isc (mA)	-	+ 31
	FF (%)	-	-0.05
Finger	Geometry		

Fig2. Test on N-TOPCon cells with Dual printing and same Busbar

IMPROVED PRINTABILITY

Beyond the electrical performance, SOL9390 Series have improved printability and flooding characteristics over the SOL9380 Series, which enables superior line shape, uniformity and higher aspect ratio .

	Reference	SOL9390
Morphology		
Height[um]	15.54	18.96
Width[um]	47.94	43.84
AR[%]	32.41	43.24

Fig3. SOL9390 shows better morphology and higher AR

TYPICAL PROPERTIES

Wafer types:

- N-type PERT/ TOPCon

Solid content: 91.00±1 %

Fineness of Grind (FOG):

- 4th scratch: ≤12 μm
- 50 %: ≤ 8 μm

Viscosity:

CPE-51 spindle (Brookfield):

50–150 kcps @ 1 RPM, 25°C

RECOMMENDED PROCESSING GUIDELINES

Printing:

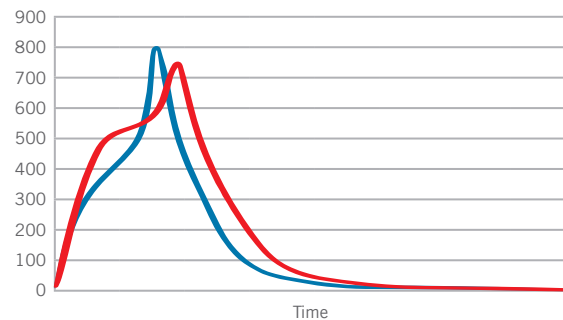
Dual Print: 380/14, 430/13 ≤28μm opening

Double Print: 380/14, 430/13 ≤24μm opening

EOM thickness: ≤15 μm EOM

Drying: Typically dried in an IR dryer with set points of 250–300°C in less than 20 seconds or 150–200°C for 10 minutes in circulated air oven.

Firing: SOL9390 has a wide firing window toward lower temperature side (Red profile).



Storage:

DO NOT REFRIGERATE.

Store in a dry location at 5°C – 25°C. Allow paste to come to room temperature prior to opening. Spatulate well before using

*Contact your Application Engineering Team partner for individual advice.

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