
GLOSSARY OF TECHNICAL TERMS

This glossary contains definitions of certain terms used in this Document in connection with our Company and our business. Some of these may not correspond to standard industry definitions or usage of these terms.

“ammonia solution (氨水)”	a solution of ammonia in water, often used in the synthesis process of silver powder to control particle size and morphology, as well as modify surface properties during production
“anhydrous ethanol (無水乙醇)”	ethanol that is free of water or has very low water content, often used as a solvent during the washing stages in the silver powder production process to remove impurities and ensure the quality of the final product
“burn-off loss (燃燒損失)”	the weight loss of silver powder or related materials during high-temperature processing, primarily due to the evaporation or decomposition of organic binders, dispersants, or residual processing agents
“centrifuge”	high-speed rotating equipment used to separate solid particles from liquids based on density differences, commonly employed in the production and refinement of silver powder to remove impurities and achieve desired particle size distribution
“conductivity”	the ability of silver powder or silver paste to conduct electricity; higher conductivity in silver powder or silver paste is critical for its effectiveness in PV cells, as it facilitates the efficient transfer of electrical charge
“consistency”	the uniformity of the physical properties of silver powder, such as particle size and morphology, which can affect the performance in downstream PV cell applications such as conversion efficiency and stability
“crystallinity (結晶度)”	the degree of structural order and arrangement of atoms in silver powder particles. In silver powder production, it represents the level of crystal structure in the silver particles, including monocrystalline and polycrystalline and ranging from high to low crystallinity. The level of crystallinity affects the sintering activity of the silver powder
“dispersant (分散劑)”	a substance used in the production of silver powder by the liquid-phase reduction method to control the size and shape of the silver particles and prevent agglomeration
“dispersibility (分散性)”	the ability of silver powder particles to be evenly distributed in a liquid medium or paste. Good dispersibility is essential for the uniform application of silver powder in the manufacturing of PV silver paste and PV cells
“drying loss (乾燥損失)”	the percentage of moisture or volatile substances that evaporate from silver powder during the drying process
“fatty acid (油酸)”	an organic compound with a long hydrocarbon chain and a carboxyl group ($-\text{COOH}$), often used as an ancillary material to improve the dispersion and stability of silver particles in silver powder production

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“front-side fine grids (正面細柵)”	fine gridlines printed on the front surface of PERC cells and TOPCon cells using silver paste. These grids help collect the electrical output from the cell, with the quality of these grids directly affecting cell efficiency
“functional group bonding”	the chemical interaction between functional groups, such as hydroxyl, carboxyl, or amine groups, in dispersants, binders, or surface-modified silver particles, influencing the stability, dispersion, and adhesion properties of silver powder in various formulations
“GW”	gigawatt; a unit of power used to measure large-scale energy production
“HJT cells”	Heterojunction cells; a type of N-type PV cells that combines both monocrystalline silicon and amorphous silicon layers. These cells are known for their high efficiency
“hydrophilic (親水性)”	silver powder or materials that attract water molecules. Hydrophilic silver powder is used in specific PV silver paste applications requiring enhanced wetting properties
“kg”	kilogramme
“liquid-phase reduction method”	a process used to produce silver powder in which silver ions in a solution are reduced to metallic silver particles through the addition of a reducing agent, resulting in the formation of fine silver powder
“mono-dispersity (單分散性)”	the uniformity of the particle size and particle morphology in silver powder. High mono-dispersity indicates a high degree of uniformity and absence of variations in particle size and morphology
“monocrystalline (單晶)”	a type of crystal structure where a silver powder particle is made from a single crystal
“N-type cells”	a type of PV cells in which the base material is doped with electron-donating elements, providing higher efficiency and durability compared to P-type cells
“nano-electronic materials”	materials engineered at the nanometer scale (typically less than 100 nanometers), providing benefits such as improved conductivity, smaller form factors, and higher efficiency in PV cell applications
“nanocrystalline configurations”	particle configurations in silver powder that feature nanoscale crystal structures, offering enhanced conductivity and sintering properties for PV cells
“non-polar (非極性)”	a type of surface treatment for silver powder particles where they do not have an affinity for water
“oleophilic (親油性)”	describes silver powder that has an affinity for oils. This characteristic is essential for applications that require specific interactions with organic solvents or other non-polar substances
“particle morphology”	the shape of silver powder particles, which can range from spherical to more complex shapes such as flakes or rods. Particle morphology plays a significant role in the performance of PV cells

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“particle surface treatment”	modifications made to the surface of silver powder particles to alter their chemical or physical properties, improving their performance in applications such as PV cells
“PERC cells” or “P-type PERC cells”	Passivated Emitter and Rear Contact Cells; a type of PV cells designed with an additional passivation layer on the rear side, which enhances light absorption and reduces electron recombination, thereby improving overall efficiency
“permeability (透過性)”	the ability of silver paste to pass through a screen during the printing process, affecting the print quality, line resolution and consistency in the fabrication of PV cells or electronic components. High permeability contributes to better screen printing efficiency and finer feature definition
“pH value”	a measure of the acidity or alkalinity of a solution
“polar (極性)”	a property of silver powder particles that interacts with water molecules, often used for applications where these interactions are required
“polycrystalline (多晶)”	a type of crystal structure where a silver powder particle are made from multiple crystals, which affects its physical properties and application in different PV cell technologies
“polyvinyl pyrrolidone (聚乙烯吡咯烷酮)”	a polymer with the chemical formula $((C_6H_9NO)_n)$; a type of dispersants
“porous granular (多孔顆粒)”	a type of silver powder with a porous structure, providing unique properties such as enhanced sintering activity and better adhesion to substrates in PV applications
“printability”	the ability of silver paste to be easily applied through printing processes such as screen printing, essential for creating precise patterns on PV cells
“printed circuit boards”	thin boards made of insulating material, such as fibreglass, with conductive pathways etched or printed onto them to electrically connect and support various electronic components
“PV”	photovoltaic; the technology and method of converting sunlight directly into electricity using semiconductor materials
“PV cells”	individual units that convert sunlight into electrical energy through the photovoltaic effect, forming the fundamental building blocks of solar panels
“reducing agent”	a substance used in the production of silver powder by the liquid-phase reduction method that donates electrons to silver ions in solution, causing them to be chemically reduced to metallic silver particles
“R&D”	research and development
“screen printing”	a technique used to apply silver paste onto PV cells to create fine electrical contacts

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“semiconductor packaging”	the process of enclosing and protecting semiconductor devices, such as integrated circuits, to provide physical support, electrical connections, and heat dissipation, facilitating their integration into electronic systems
“silver nitrate”	an inorganic compound with the chemical formula AgNO_3 , commonly used in various chemical reactions and industrial applications due to its solubility in water and its role as a precursor to other silver compounds
“silver paste”	a conductive paste made from silver powder, essential for forming electrical contacts in PV cells
“silver-coated copper powder”	a composite conductive material consisting of copper particles coated with a thin layer of silver, balancing conductivity and cost efficiency for applications in PV silver paste, conductive adhesives, and electronic components
“sintering activity (焼結活性)”	the ability of silver powder to bond and shrink during the heating process, which is crucial for its role in forming strong electrical contacts in PV cells
“sq. m.”	square metre(s)
“substrate”	the base material onto which silver powder or silver-based conductive layers are applied, commonly including silicon wafers for PV cells, ceramic bases for multilayer ceramic capacitors, and polymer films for printed electronics
“tap density (振實密度)”	the bulk density of silver powder or other particulate materials measured after mechanically tapping or vibrating the sample, indicating packing efficiency and affecting flowability in conductive pastes and powder-based applications
“thermogravimetric analyser”	an instrument used to measure the weight changes of silver powder or related materials under controlled temperature conditions, providing data on thermal stability, burn-off loss, and organic residue content for quality control
“TOPCon cell LECO technology”	a specific advancement in TOPCon PV cells that focuses on enhancing Light and Elevated Temperature Induced Degradation (LeTID) resistance, thereby improving the long-term performance and efficiency of the PV cells
“TOPCon cells”	Tunnel Oxide Passivated Contact Cells; advanced PV cells that incorporate a thin tunnelling oxide layer and a passivated contact layer, enhancing efficiency by reducing electron recombination and improving conductivity
“ultrasonic reactor”	a processing equipment that uses high-frequency ultrasonic waves to disperse, homogenise, or modify silver powder particles, enhancing particle size uniformity and dispersion in conductive pastes and inks
“xBC cells”	a type of high-efficiency PV cell design where both the positive and negative electrical contacts are placed on the rear side of the cell, reducing shading on the front and improving overall energy conversion efficiency
“µm”	micrometre; a unit of length equal to one-millionth of a metre (10^{-6} m)