

Shanghai Truer Technology Co., Ltd.

Shanghai Truer Technology Co., Ltd. (Truer Technology) is one of the subsidiaries of Truer group, which is mainly responsible for the export business. At present, the main products cover the raw materials, production equipment, inspection devices and service for additive manufacturing (AM), Metal Injection Molding (MIM), Powder Metallurgy (PM), automation and other manufacturing fields.

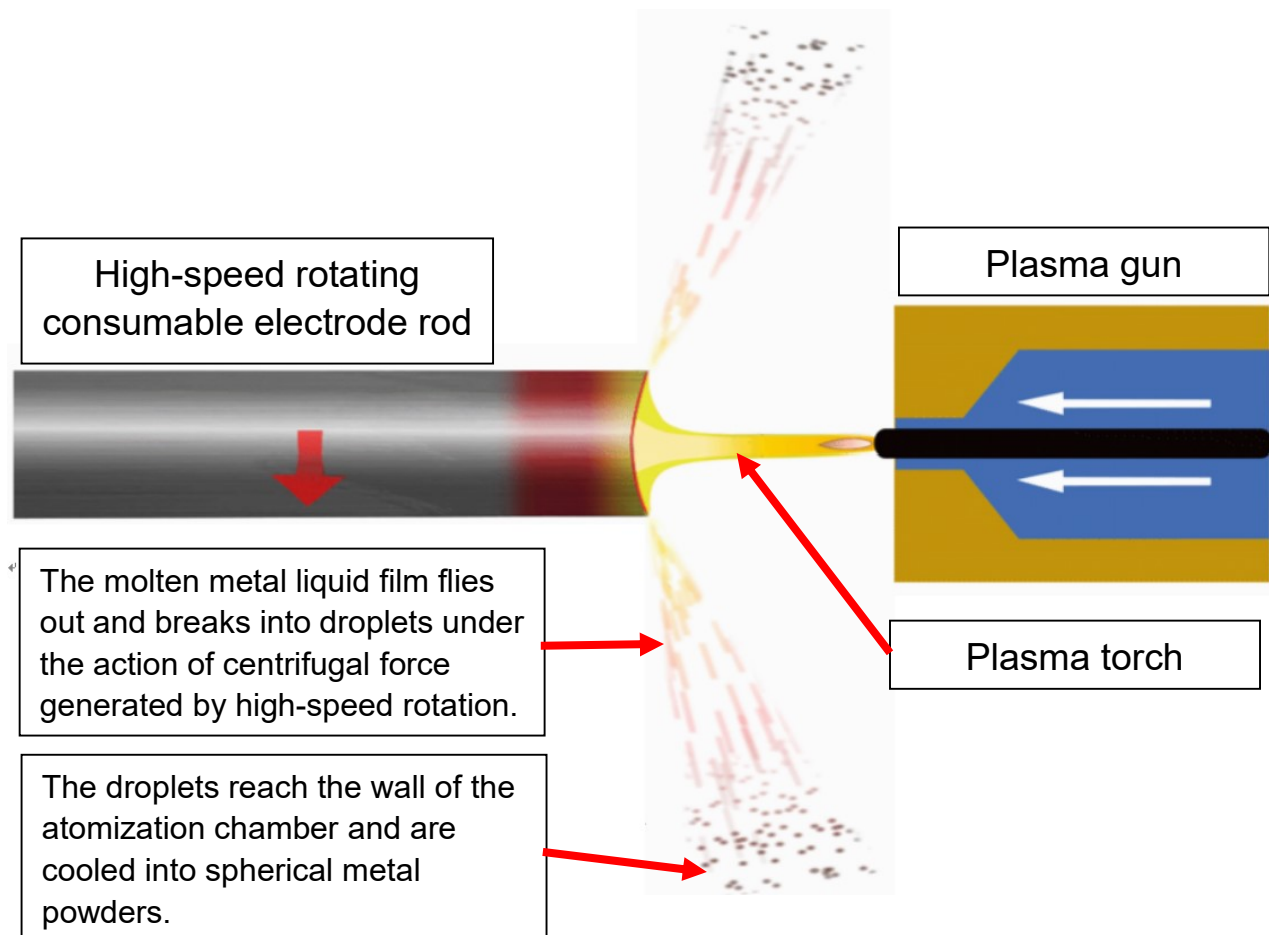
At present, we have 12 factories and more than 30 strategic partners in China for different applications.

We take the lead in providing innovative desktop level plasma rotating electrode atomizing powder making equipment (SLPA-D) globally. The maximum rotation speed of consumable electrode rods can reach 50,000 rpm, which is very suitable for the preparation of small batch, multi variety and high-quality metal powders. Using this equipment, we and our customers have successfully developed more than 60 different compositions of high-quality spherical metal powders such as TiNi, Tita, TiAl, TiNbZr and CoCrMo. In addition, we also provide the medium-sized PREP metal powder making equipment (SLPA-N50) and large-scale metal powder making equipment (SLPA-N75), which are suitable for industrial production and provide high-quality metal powders with reasonable cost for 3D printing and other applications.

We are committed to providing the suitable plasma rotating electrode atomizing metal powder making equipment or high-quality PREP metal powders to meet different customers' requirements, i.e. new material development, or production of high-quality parts, etc. We will continue to invest in R&D to optimize our plasma rotating electrode metal powder making equipment and production process, in order to provide customers with the best quality PREPped metal powders.

Principle of Plasma Rotating Electrode Process (PREP)

The high-temperature plasma torch melts one end face of the high-speed rotating electrode rod (raw materials), then the molten metal liquid film flies out and breaks into droplets under the action of centrifugal force generated by high-speed rotation. Some droplets will collide with inert gas molecules and break into smaller droplets. All these droplets are gradually solidified under the action of surface tension during flight and become spherical, and finally they reach the wall of the atomizing chamber and are cooled into spherical metal powders.



Small-scale PREP system: SLPA-D



The small-scale PREP system (SLPA-D, desktop level) is purposely designed for R&D of novel alloy powders and small batch production of high quality powders with the following characteristics:

- ✓ Relatively lower cost for multi-small-batch production
- ✓ Quicker switch for multi-small-batch and diversified powder production (time reduction)
- ✓ Ergonomics friendly, easy to operate
- ✓ Simple and professional man-machine interface design
- ✓ High fine powders output rate due to high rotating speed (up to 50,000rpm)
- ✓ The produced powders have high sphericity (over 95%) and high quality, such as low porosity powders, low satellite powders, high purity (low oxygen increase, $\leq 100\text{ppm}$) due to atomizing in the inert protection atmosphere.
- ✓ Can produce nearly all metal powders which rods are electro-conductive, specially for refractory metals, high-activity metals, super-alloys, etc.

Main Technical Parameters and Structure

Main Technical Parameters	
Rotating speed of electrode rod	Up to 50,000rpm (Adjustable)
Diameter of Electrode rod	Φ30mmx160mm
Powder Morphology	Spherical Rate ≥95%
Particle Size Distribution	D50≤43μm (Inconel 718)
Capacity	≥10kg (8hrs, Inconel 718)
Oxygen Increment	≤100ppm (Ti6Al4V ≤100ppm; Inconel 718 ≤50ppm)
Atmosphere	Ar or He (high purity) or other inert gas
Maximum power	120kW
Machine size	4m x 3m x 2.5m
Applications	Ti&Alloys, Ni&Alloys, Co&Alloys, Stainless steels, high entropy alloys, Cu& Alloys and refractory alloys

Main Sub-systems		
1	Plasma gun system	In-house design and manufacturing
2	High rotating speed shaft system and dynamic sealing mechanism	In-house design and outsourced
3	Feeding system	In-house design and outsourced
4	Powder collection system	In-house design and outsourced
5	Atomization chamber	In-house design and outsourced
6	Vacuum system	Outsourced
7	Cooling system	In-house design and outsourced
8	Gas supply system	In-house design and outsourced
9	Power supply and Electrical control system	Outsourced

Typical Particle Size Distribution of Metal Powders produced by SLPA-D

Ti6Al4V	Mesh	+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>150	106-150	75-106	53-75	45-53	<45
	%	7.39	11.81	18.89	45.98	9.10	7.83

Inconel 718	Mesh	+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>150	106-150	75-106	53-75	45-53	<45
	%	0.09	1.57	8.80	10.52	15.58	63.44

Pure Tungsten	Mesh	+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>150	106-150	75-106	53-75	45-53	<45
	%	0.0	3.6	23.1	43.0	12.0	18.3

CoCrMo	Mesh	+100	-100/+150	-150/+200	-200/+230	-230/+270	-270/+325	-325
	μ m	>150	100-150	75-100	75-106	53-75	45-53	<45
	%	0.0	3.4	11.3	14.8	20.2	8.0	42.3

High entropy alloy AlCoNiCrCu	Mesh	+100	-100/+150	-150/+200	-200/+230	-230/+270	-270/+325	-325
	μ m	>150	100-150	75-100	75-106	53-75	45-53	<45
	%	0.3	4.5	8.0	25.1	20.8	22.7	18.6

CuCrZr	Mesh	+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>150	106-150	75-106	53-75	45-53	<45
	%	0.0	3.0	30.8	37.1	11.8	17.3

316H	Mesh	+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>150	106-150	75-106	53-75	45-53	<45
	%	0.02	1.88	29.40	21.50	12.50	34.70

Medium-scale PREP system: SLPA-N50



The medium-scale PREP system (SLPA-N50) is purposely designed for continuous, industrial mass production of high quality spherical metal powders with the following characteristics:

- ✓ Reasonable cost for medium-batch production
- ✓ Ergonomics friendly, easy to operate
- ✓ Simple and professional man-machine interface design
- ✓ Relatively high fine powders output rate (average rotating speed: 30,000rpm)
- ✓ The produced powders have high sphericity (over 90%) and high quality, such as low porosity powders, low satellite powders, high purity (low oxygen increase, $\leq 120\text{ppm}$) due to atomizing in the inert protection atmosphere.
- ✓ Melting temperature $\geq 2600^{\circ}\text{C}$, suitable for production of Ti-alloys, Steels, Superalloys, Refractory alloys, high entropy alloys, etc.

Main Technical Parameters and Structure

Main Technical Parameters	
Rotating speed of electrode rod	Average 30,000rpm (Adjustable)
Diameter of Electrode rod	Φ50mmx260mm
Powder Morphology	Spherical Rate ≥95%
Particle Size Distribution	D50≤63μm (Ni-base superalloys) D50≤105μm (Ti-alloys) D50≤100μm (W-alloys)
Capacity	≥80kg (8h, Ni-base superalloys) ≥40kg (8h, Ti-alloys) ≥100kg (8h, W-alloys)
Oxygen Increment	≤120ppm
Atmosphere	Ar or He (high purity) or other inert gas
Maximum power	260kW
Machine size	6m x 6m x 5m
Applications	Ti&Alloys, Ni&Alloys, Co&Alloys, Stainless steels, high entropy alloys, Cu& Alloys and refractory alloys, etc.

Main Sub-systems		
1	Plasma gun system	In-house design and manufacturing
2	High rotating speed shaft system and dynamic sealing mechanism	In-house design and outsourced
3	Feeding system	In-house design and outsourced
4	Powder collection system	In-house design and outsourced
5	Atomization chamber	In-house design and outsourced
6	Vacuum system	Outsourced
7	Cooling system	In-house design and outsourced
8	Gas supply system	In-house design and outsourced
9	Power supply and Electrical control system	Outsourced

Typical Particle Size Distribution of Metal Powders produced by SLPA-N50

Ti6Al4V	Mesh	+60	-60/+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>250	150-250	106-150	75-106	53-75	45-53	<45
	%	0.5	14.6	50.3	22.7	8.7	1.7	1.5
Ti2AlNb	Mesh	+60	-60/+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>250	150-250	106-150	75-106	53-75	45-53	<45
	%	1.2	2.5	21.1	29.2	32.8	6.7	6.5
Inconel 718	Mesh	+60	-60/+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>250	150-250	106-150	75-106	53-75	45-53	<45
	%	0	3.9	16.7	19.8	45.1	8.9	1.7
TiAl4822	Mesh	+60	-60/+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>250	150-250	106-150	75-106	53-75	45-53	<45
	%	9.8	30.2	30.9	19.7	7.7	0.9	0.8
Inconel 625	Mesh	+60	-60/+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>250	150-250	106-150	75-106	53-75	45-53	<45
	%	0	0.7	5.2	15.6	49.9	15.3	13.3
Zr2.5Nb	Mesh	+60	-60/+100	-100/+140	-140/+200	-200/+270	-270/+325	-325
	μ m	>250	150-250	106-150	75-106	53-75	45-53	<45
	%	0.10	11.06	39.59	33.67	11.78	2.14	1.66

Large-scale PREP system: SLPA-N75



The large-scale PREP equipment (SLPA-N75) is purposely designed for continuous, industrial mass production of high quality spherical Titanium alloy powders with the following characteristics:

- ✓ Reasonable cost for large-batch production
- ✓ Ergonomics friendly, easy to operate
- ✓ Simple and professional man-machine interface design
- ✓ Relatively lower fine powders output rate (rotating speed up to 22,000rpm)
- ✓ The produced powders have high sphericity (over 90%) and high quality, such as low porosity powders, low satellite powders, high purity (low oxygen increase, $\leq 120\text{ppm}$) due to atomizing in the inert protection atmosphere.
- ✓ Suitable for production of metal powders with melting point $\leq 2,600\text{ }^\circ\text{C}$, mainly for Titanium alloys.

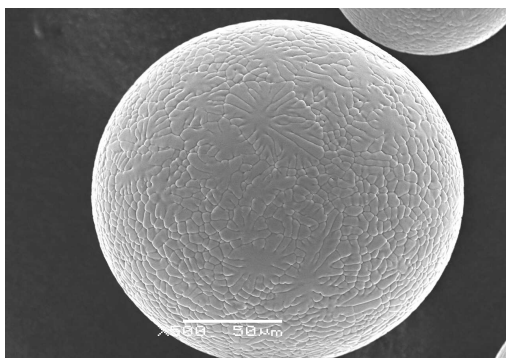
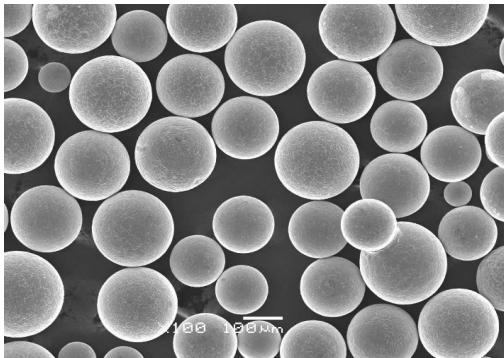
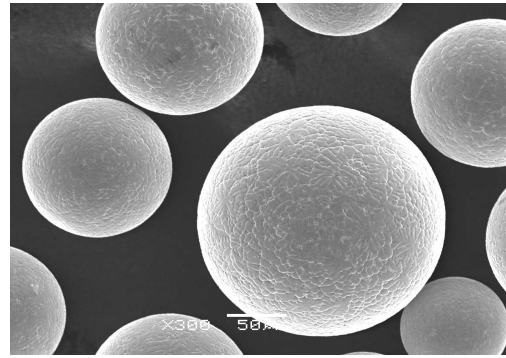
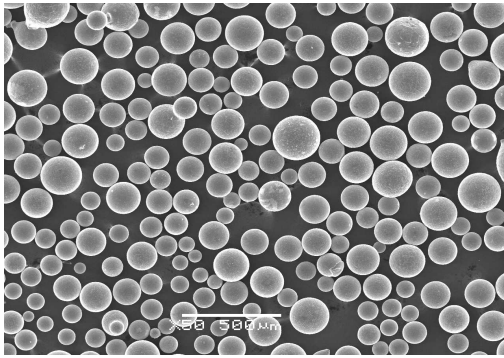
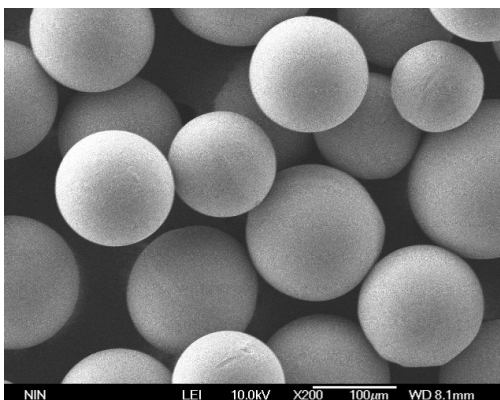
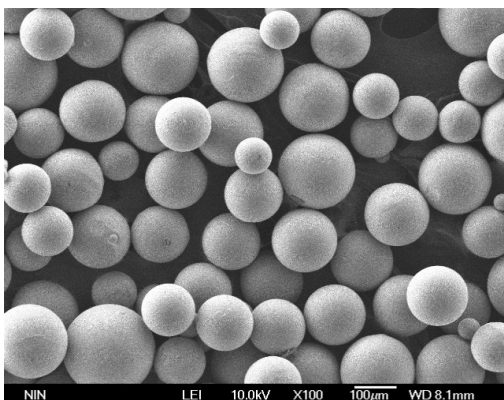
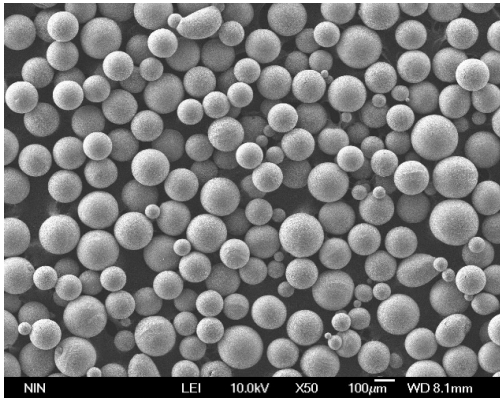
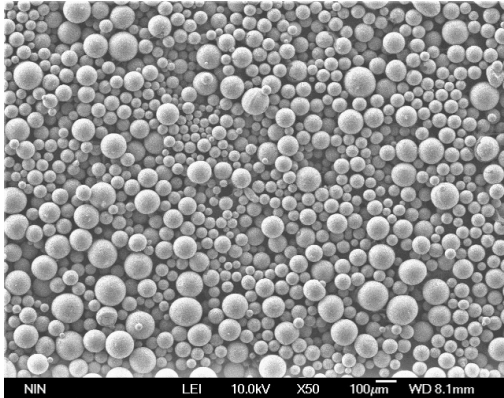
Main Technical Parameters and Structure

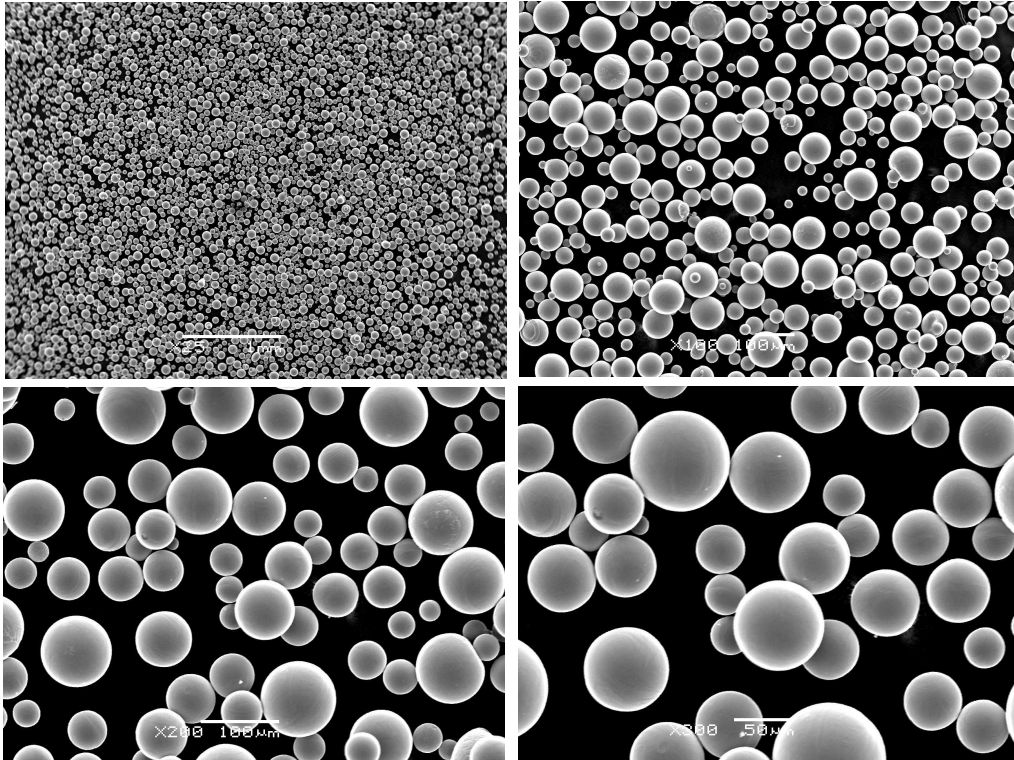
Main Technical Parameters	
Rotating speed of electrode rod	Up to 22,000rpm (Adjustable)
Diameter of Electrode rod	Φ75mmx360mm
Powder Morphology	Spherical Rate ≥90%
Particle Size Distribution	TA15: -150μm≥75%
Capacity	≥100kg (8h, TA15)
Oxygen Increment	≤120ppm
Atmosphere	Ar or He (high purity) or other inert gas
Maximum power	300kW
Floor Space	8m x 8m x 6m
Applications	Ti&Alloys, Ni&Alloys, Co&Alloys, Stainless steels, high entropy alloys, etc.

Main Sub-systems		
1	Plasma gun system	In-house design and manufacturing
2	High rotating speed shaft system and dynamic sealing mechanism	In-house design and outsourced
3	Feeding system	In-house design and outsourced
4	Powder collection system	In-house design and outsourced
5	Atomization chamber	In-house design and outsourced
6	Vacuum system	Outsourced
7	Cooling system	In-house design and outsourced
8	Gas supply system	In-house design and outsourced
9	Power supply and Electrical control system	Outsourced

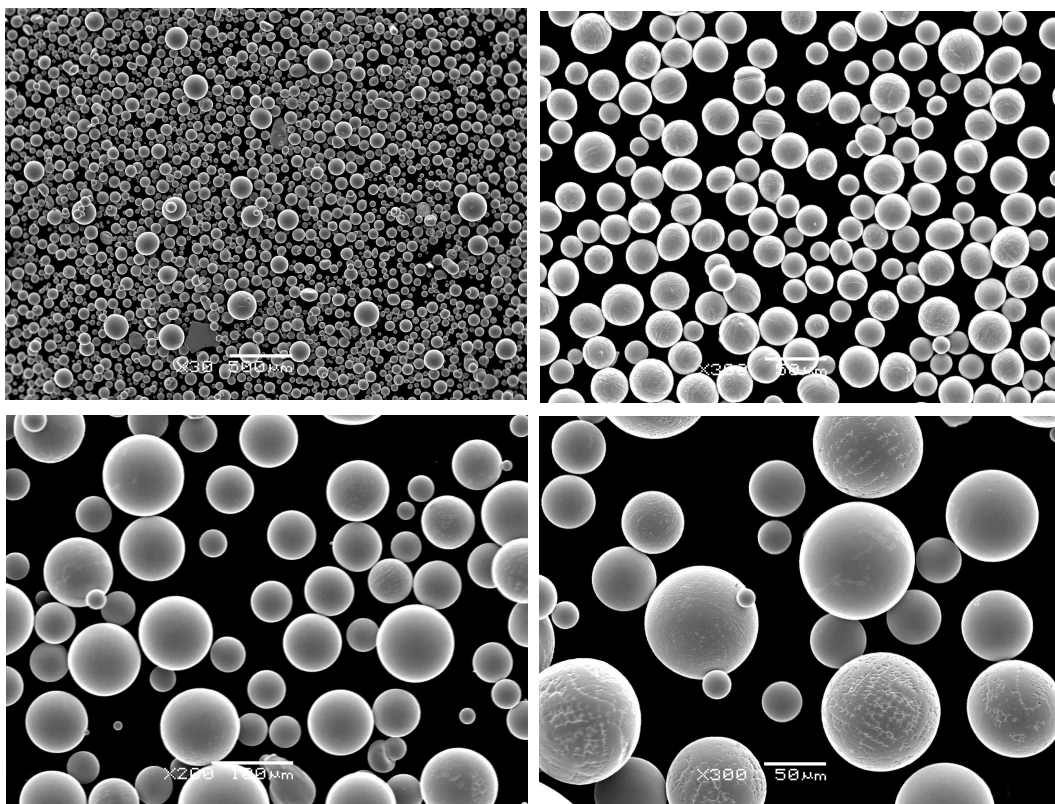
Typical Particle Size Distribution of Metal Powders produced by SLPA-N75

TA15	Mesh	+60	-60	-100			
	μ m	>250	<250	<150			
	%	≤ 5.0	≥ 95.0	≥ 75.0			

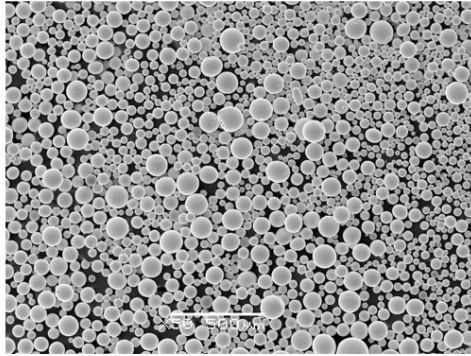
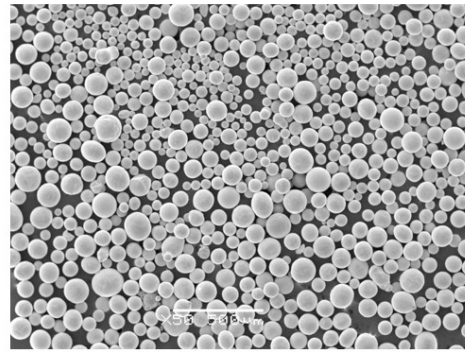
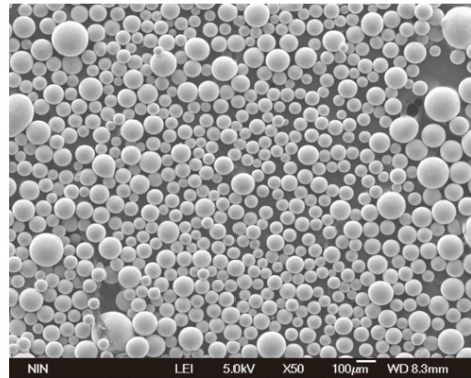
Typical Morphology of Metal Powders produced by PREP systems**AlSi10Mg powders produced by PREP system****Ti6Al4V (TC4) powders produced by PREP system**



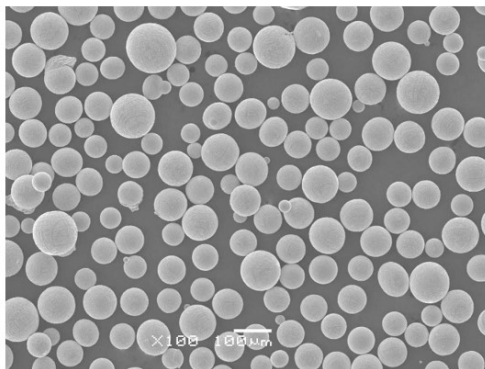
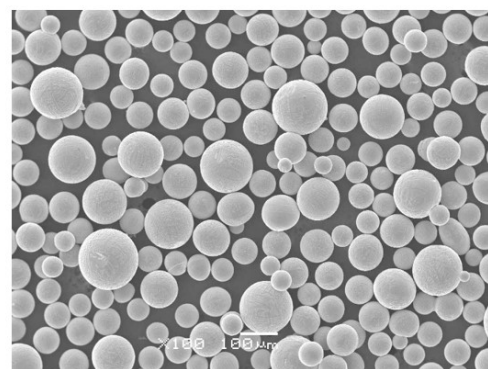
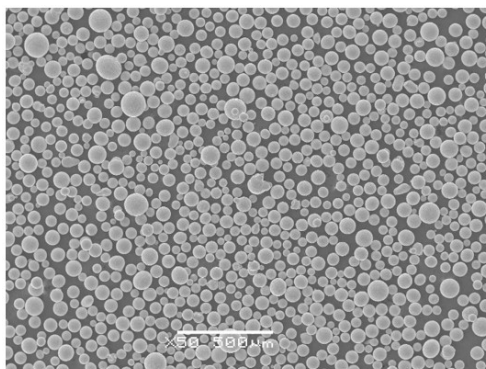
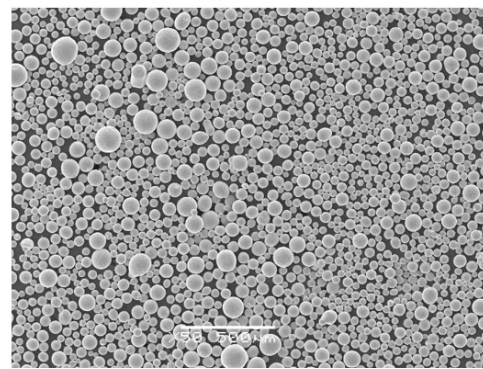
High purity Ti powders produced by PREP system



In718 powders produced by PREP system

**Ta powders****Nb521 powders****CoCrMo powders**

Refractory Metal and Alloy powders produced by PREP system

**GCr15 powders****30Cr powders****Steel C45 powders****316L powders**

Steel Alloy powders produced by PREP system

Example characteristics of metal powders produced by PREP system

No.	Material code	Oxygen in raw material rods	Oxygen in metal powders	Oxygen increase
1	Ti48Al2Cr2Nb	470	560	90
2	Ti45Al8Nb	580	650	70
3	Nb521	150	250	100
4	Mo	35	100	65
5	Ta	40	10~30	-10↓

No.	Material code	Flow rate (s/50g)	Apparent density (g/cm ³)	Tap density (g/cm ³)
1	Ti48Al2Cr2Nb	28.3	2.39	2.59
2	Ti45Al8Nb	28.6	2.55	2.70
3	Nb521	11.8	5.33	5.88
4	Mo	9.9	6.10	6.58
5	Ta	6.0	9.97	10.60

Thank you for your attention!

Shanghai Truer Technology Co.,Ltd

No. 299, Songqiu Road, Qingpu District, Shanghai, China 201703

Tel: +86-21-34320902

Mobile:+86-15250014048 / 15250232891 / 13611869448 / 17316565943

Email: luke.zhang@prep-system.com / lucy.wen@prep-system.com /cassiel.ding@prep-system.com / joan.zhou@prep-system.com<https://www.prep-system.com>