



Technical Data Sheet (TDS)

Product Name: XT 20% Silver on Ketjenblack EC300J Grade T

Fuel Cell Store SKU Numbers: 11080065, 11080066, 11080067

Form: Fine powder

Application: Catalyst for electrochemical applications and other R&D use cases

1. General Information

Parameter	Specification
Appearance	Fine, porous black powder
Composition (wt%)	~ 20 wt% Ag, ~80 wt% Carbon support
Molecular Formula	Not applicable (heterogeneous composite)
Metal Purity	≥ 99.9 % (Ag metal basis)
Storage	Store in a tightly sealed, antistatic container under dry conditions at room temperature.

2. Physical Properties

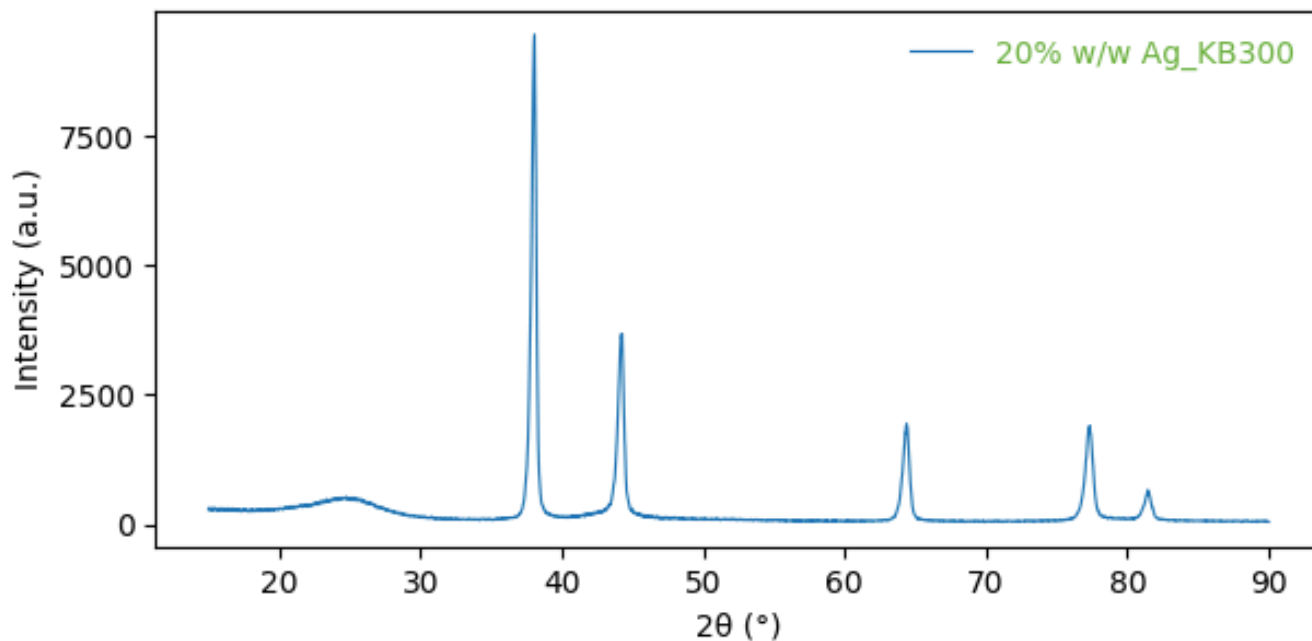
Property	Value
Particle Morphology	Nanocrystalline Ag clusters uniformly dispersed on high-surface-area carbon
Average Particle Size	26.8 μm (D_{50} , Laser Diffraction)
Particle Size Range	μm (D_{10} – D_{90})
BET Surface Area	In the range of 555-595 m^2/g
Bulk Density	~0.18 - 0.28 g/cm^3
Color	Black

3. Structural Characterization (X-ray Diffraction)

Phase Identified:

- **Structure** : Face-centered cubic (fcc) Silver (0)
 - **Database Reference:** COD Card No. (9011607); JCPDS No. (04-0783)
 - **Space Group** : *Fm-3m*
 - **Secondary Phases** : None detected
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- **Instrument:** Rigaku MiniFlex 300/600
- **Cu-K α radiation** ($\lambda = 1.5406 \text{ \AA}$ | **scan rate:** $0.5^\circ/\text{min}$ | **step size:** $0.02^\circ(2\theta)$,
- **2θ range:** $10\text{--}90^\circ$ | **optics:** Monochromator



Selected Diffraction Peaks:

hkl Plane	2 θ (°)	d-spacing (Å)	FWHM (°)	Crystallite Size (nm)	Relative Intensity (%)
(111)	38.07	2.361	0.39	22.3	100.0
(200)	44.20	2.047	0.44	20.9	52.03
(220)	64.39	1.445	0.49	19.8	27.31

Lattice Parameters:

Parameter	Value (Å/°)
a = b=c	4.0903 Å
α, β, γ	90°

Bond Distances:

- Ag-Ag nearest-neighbour distance: 2.892 Å
- Consistent with FCC 12-fold cubic coordination.

4. Surface Area Analysis (BET)

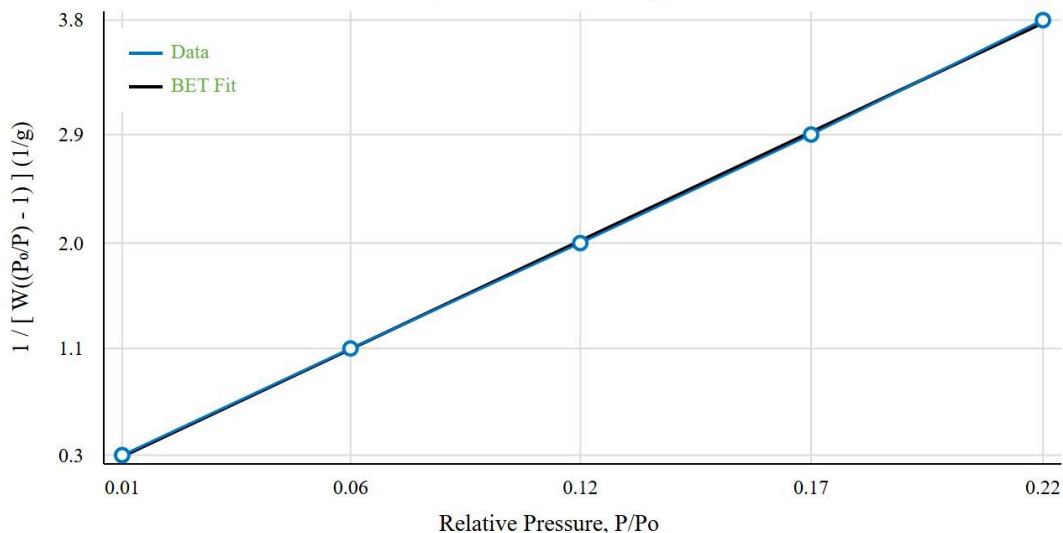
Instrument: Anton Paar QuantaChrome NOVA

Adsorption gas: N₂, Bath temperature: 77.3 K

- Degassing Conditions: **4 hrs, 100°C**
Sample Weight: **0.2995 g**
Sample Volume: **0.07679 cc**
Equilibration Time: **60 sec (adsorption/desorption)**
Relative Pressure Range (P/P₀): **~0.021 – 0.22**
Analysis Time: **116.2 minutes**



Multi-Point BET Plot



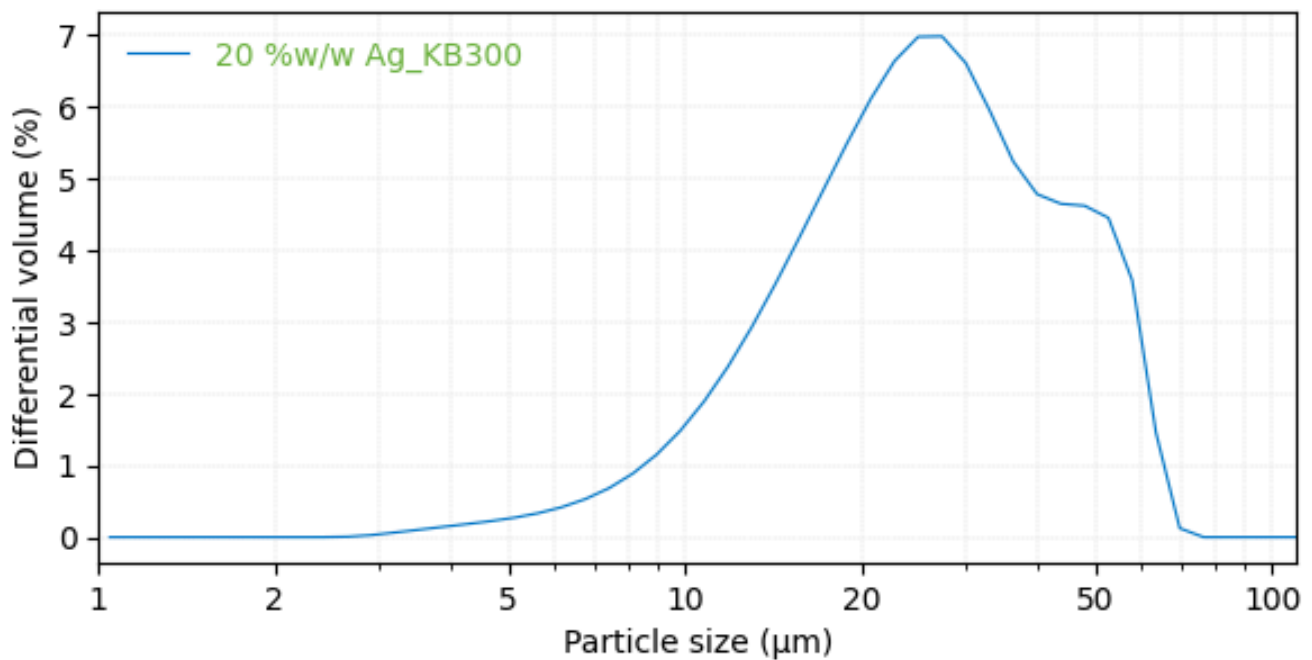
BET Results Summary:

BET surface area for this particular production batch: **575.367 m²/g**,
C constant: 596.062,
slope: 6.043 (1/g),
intercept: 0.01 (1/g),
correlation coefficient (r²): 0.9999

5. Particle Size Distribution (Laser Diffraction):

Instrument: Beckman Coulter LS 13 320 | **Fluid:** Water

Measurement Type: Average of 3 runs



Percentile Values:

- D₁₀: 12.60 µm
 - D₂₅: 18.41 µm
 - D₅₀: (Median): 26.86 µm
 - D₇₅: 38.88 µm
 - D₉₀: 52.24 µm
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6. Handling and Safety

- **PPE:** nitrile gloves, P-100/N95 dust mask, safety goggles.
- **Exposure:** avoid inhalation or skin/eye contact.
- **Ventilation:** Work in a fume hood or well-ventilated area to limit airborne dust.
- **Combustion risk:** carbon support is combustible; silver nanoparticles can catalyse oxidation. Keep away from strong oxidisers, sparks, and open flames.
- **Disposal:** follow local regulations; recycle the silver content whenever feasible.