



Technical Data Sheet (TDS)

Product Name: XT 40% Silver on Ketjenblack EC300J Grade T

Fuel Cell Store SKU Numbers: 11080068, 11080069, 11080070

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%)	~ 40 wt% Ag, ~60 wt% Carbon support
Support	Ketjenblack EC300J
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

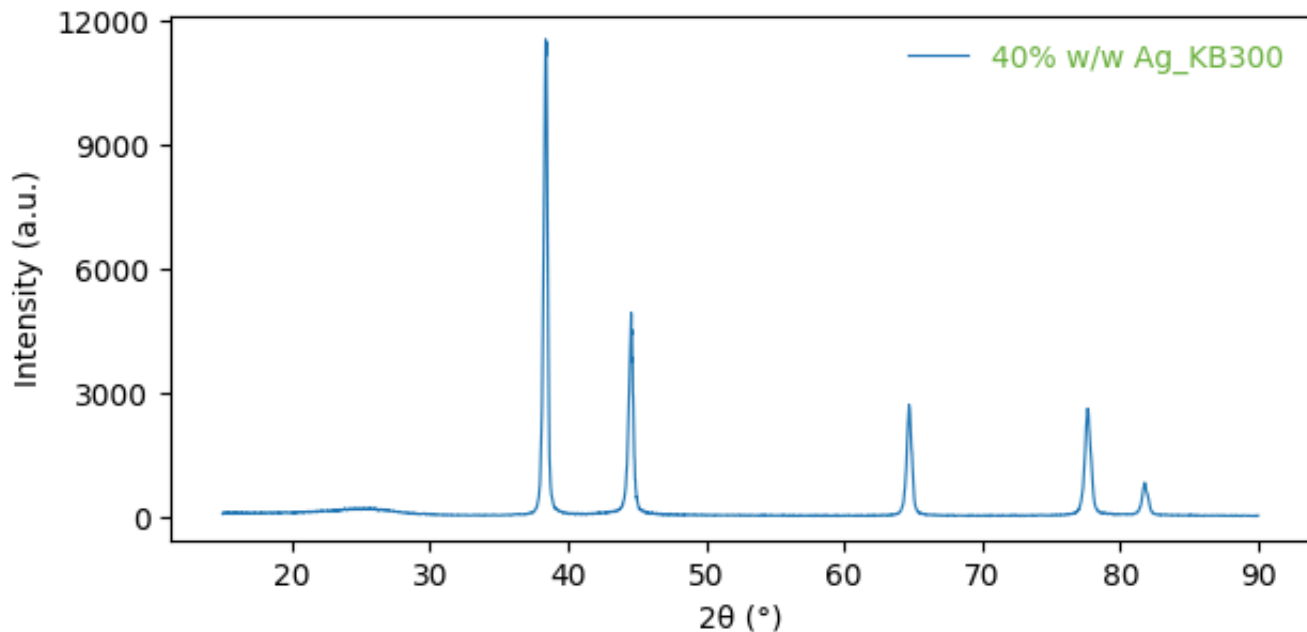
Property	Value
Particle Morphology	Nanocrystalline Ag clusters uniformly dispersed on high-surface-area carbon
Average Particle Size	27.33 μm (D_{50} , Laser Diffraction)
Particle Size Range	μm (D_{10} – D_{90})
BET Surface Area	In the range of 420 - 460 m^2/g
Bulk Density(loose Powder)	~0.24 - 0.36 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°/min | **step size:** 0.02°(2 θ),
- **2 θ range:** 10–90° | **optics:** Monochromator





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Selected Diffraction Peaks:

hkl Plane	2θ (°)	d-spacing (Å)	FWHM (°)	Crystallite Size (nm)	Relative Intensity (%)
(111)	38.42	2.340	0.29	29.5	100.0
(200)	44.58	2.030	0.34	26	50.78
(220)	64.73	1.438	0.35	27.5	30.59

Lattice Parameters:

Parameter	Value (Å/°)
a = b=c	4.066 Å
α, β, γ	90°

Bond Distances:

- Ag-Ag nearest-neighbor distance: 2.8752 Å
- Consistent with FCC 12-fold cubic coordination.



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4. Surface Area Analysis (BET)

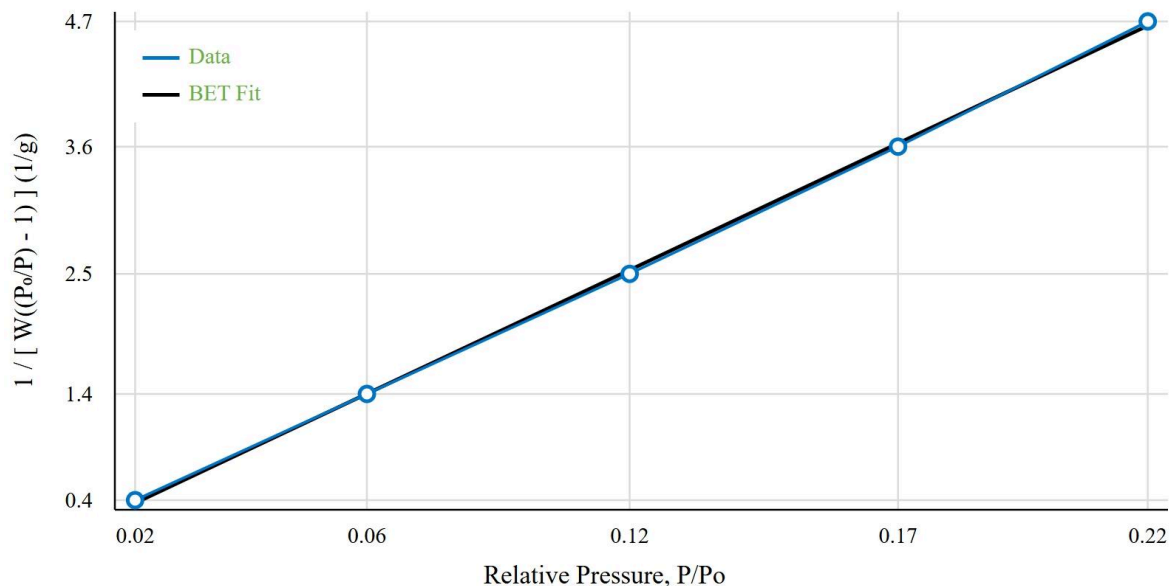
Instrument: Anton Paar QuantaChrome NOVA

Adsorption gas: N₂, Bath temperature: 77.3 K

- Degassing Conditions: 4 hrs, 100°C
Sample Weight: 0.2845 g
Sample Volume: 0.07295 cc
Equilibration Time: 60 sec (adsorption/desorption)
Relative Pressure Range (P/P₀): ~0.018 – 0.22
Analysis Time: 107.5 minutes



Multi-Point BET Plot



BET Results Summary:

BET surface area for this particular production batch: 441.389 m²/g,

C constant: 528.172,

slope: 7.875 (1/g),

intercept: 0.0149 (1/g),

correlation coefficient (r²): 0.9999

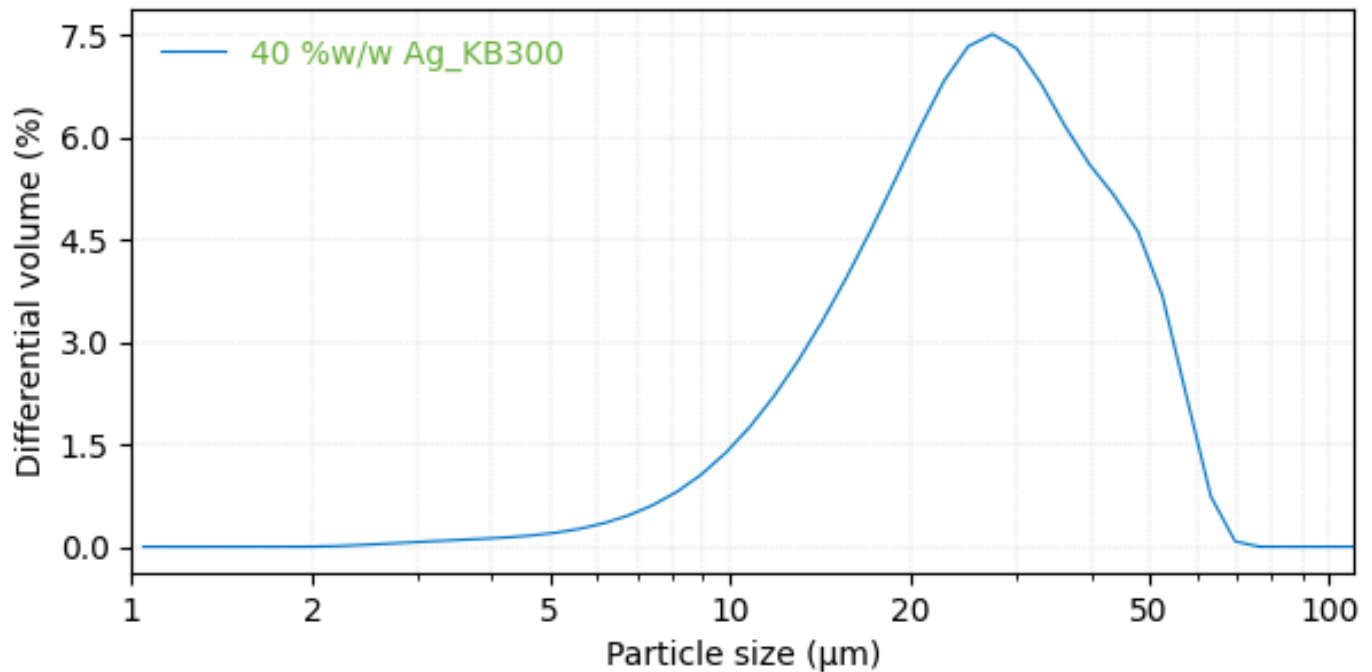


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5. Particle Size Distribution (Laser Diffraction):

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

Measurement Type: Average of 3 runs



Percentile Values:

- **D₁₀: 13.06 µm**
 - **D₂₅: 19.03 µm**
 - **D₅₀: (Median): 27.33 µm**
 - **D₇₅: 38.09 µm**
 - **D₉₀: 49.27 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.