Technical Data Sheet (TDS)

Product Name: XT Iridium Oxide Grade S
Fuel Cell Store SKU Number: 11080001
Form: Fine powder
Application: Electrocatalyst for electrochemical device applications

1. General Information

Parameter	Specification
Appearance	Dark gray to black powder IrO_2
Molecular Formula	224.22 g/mol
Molecular Weight	
Purity	> 99.9%
Storage	Store in an airtight container at room temperature in dry conditions

2. Physical Properties

Property	Value
Particle Morphology	Irregular/rough-surfaced grains
Average Particle Size	28 µm (D_{50}, Laser Diffraction)
Particle Size Range	12m (D_{10} – D_{90})
BET Surface Area	140-160 m^2/g
Bulk Density	~1.5-2 g/cm^3
Color	Black

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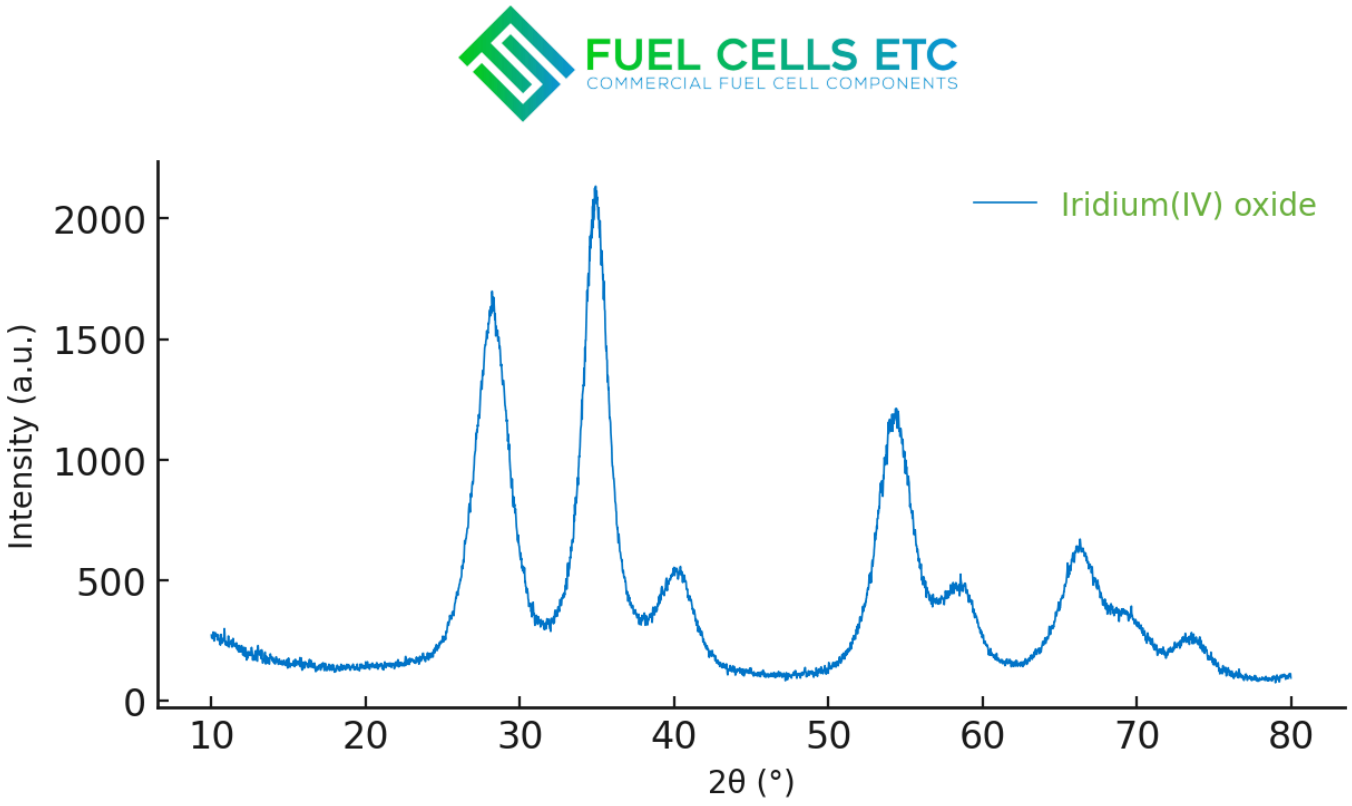
3. Structural Characterization (X-ray Diffraction)

Phase Identified:

- **Phase:** Rutile-phase RuO_2
- **Database Reference:** COD Card No. (1002524); JCPDS No. (88-0288)
- **Space Group:** *$P4_2/mnm$*
- **Secondary Phases:** None detected

- **Instrument:** Rigaku MiniFlex 300/600
- **Cu-Kα radiation** (λ = 1.5406 Å **|** **scan rate:** 0.5°/min **|** **step size:** 0.02°(2θ),
- **2θ range:** 10–80° **|** **optics:** Monochromator



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Selected Diffraction Peaks:

hkl Plane	2θ (°)	d-spacing (Å)	FWHM (°)	Crystallite Size (nm)	Relative Intensity (%)
(110)	28.23	3.157	2.691	3.2	91.23
(101)	34.89	2.258	1.948	4.46	100.0
(200)	40.24	2.239	2.74	3.23	28.39
(211)	54.29	1.688	2.43	3.83	49.96
(112)	66.27	1.409	3.36	2.95	61.95

Lattice Parameters:

Parameter	Value (Å/°)
a = b	4.4952 Å
c	3.133 Å
α, β, γ	90°

Bond Distances:

- Ir–O distances range: **1.956 Å – 1.987 Å**
- Consistent with typical distorted octahedral coordination.

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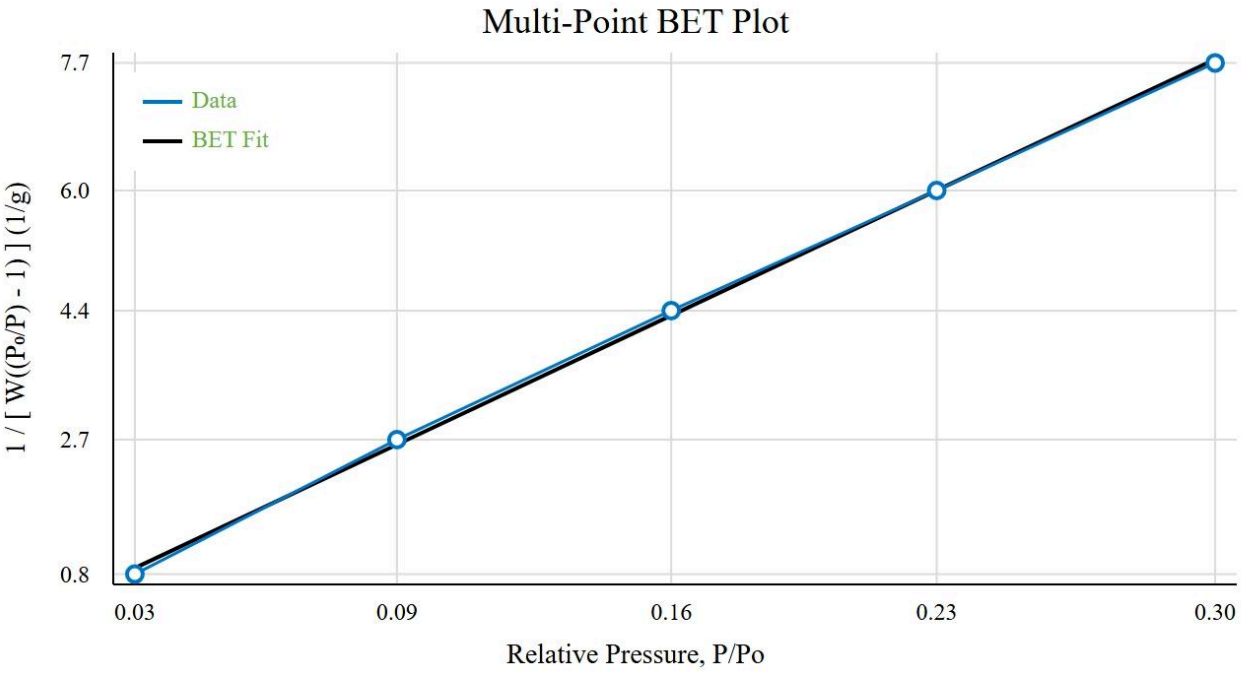
4. Surface Area Analysis (BET)

Instrument: Anton Paar QuantaChrome NOVA

Adsorption gas: N_2, Bath temperature: 77.3 K

- Degassing Conditions: **4 hrs, 100°C**
  Sample Weight: **0.205 g**
  Sample Volume: **0.05256 cc**
  Equilibration Time: **60 sec (adsorption/desorption)**
  Relative Pressure Range (P/Po): **~0.02 – 0.3**
  Analysis Time: **98.8 minutes**



BET Results Summary:

BET surface area for this particular production batch: **139.790 m²/g,**
C constant: **81.432**,
slope: **24.607** (1/g),
intercept: **0.305** (1/g),
correlation coefficient (r^2): **0.999**.

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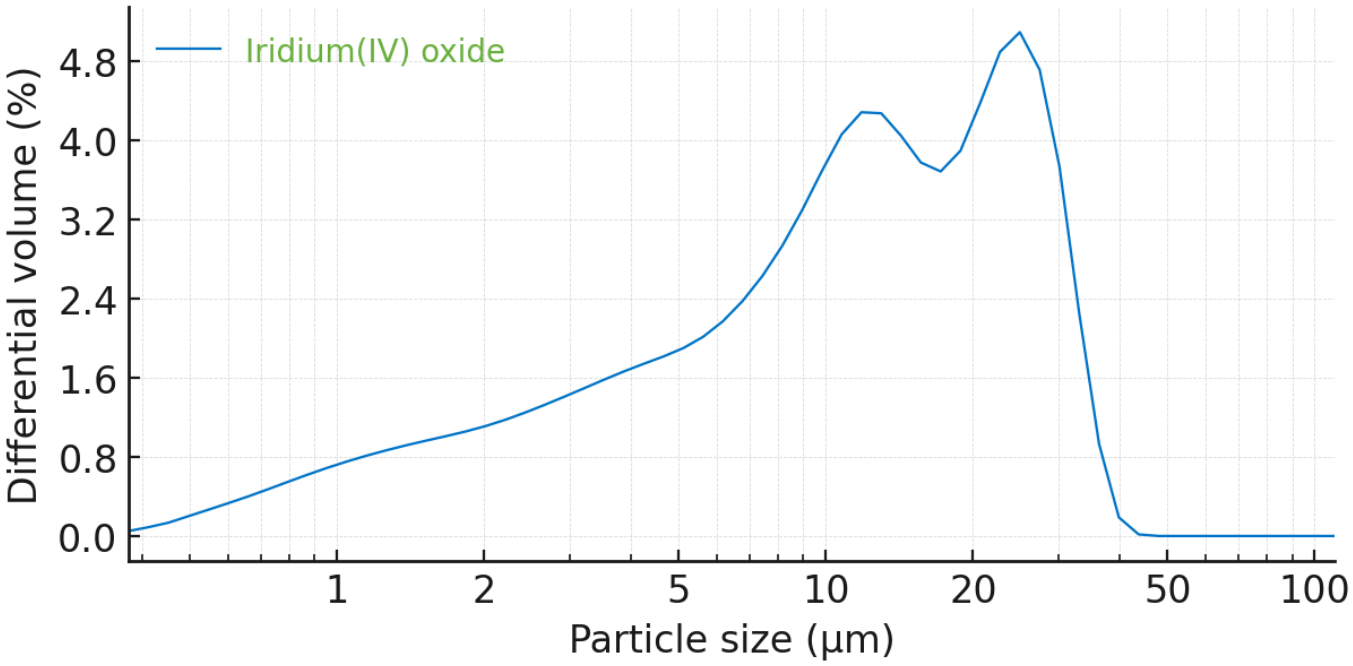
5. Particle Size Distribution (Laser Diffraction):

Instrument: Beckman Coulter LS 13 320 | **Fluid:** Water
Measurement Type: Average of 3 runs



Percentile Values:

- D_{10}: **1.98 µm**
- D_{25}: **5.17 µm**
- D_{50}: **(Median): 11.88 µm**
- D_{75}: **21.26 µm**
- D_{90}: **28.43 µm**

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6. Handling and Safety

- Use appropriate PPE: gloves, dust mask, goggles
- Avoid inhalation or contact with skin and eyes
- Dispose of material according to local regulations

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