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## NANOPOWDERS

Accumet Materials offers high quality metal nanoparticles, alloy nanoparticles, oxide nanoparticles, and rare earth oxide nanoparticles. Our products are widely used in information technology and telecommunications, aerospace, bio-pharmacology, micro-electronics, composites, coatings and paints, organic and inorganic chemicals, plastics, textiles, magnetics, and batteries.

Most of the nanopowders are agglomerated or aggregated. They must be well dispersed when needed. For large (industrial) orders, they can be dispersed upon request.

Formula Stock # CAS #	Product Name, Purity Dimension [Particle Size (PS), Average Particle Size (APS), Outside Diameter (OD), Inside Diameter (ID)] Specific Surface Area (SSA) (m <sup>2</sup> /g) Particle Morphology Crystallographic Structure
<b>Ag</b> AMCN01 7440-22-4	Silver (Ag) Purity: 99.95% APS: 80-500 nm SSA: 1.5-5 m <sup>2</sup> /g Morphology: ~ spherical
<b>Ag</b> AMCN02 7440-22-4	Silver (Ag) Purity: 99+% APS: 90-210 nm SSA: 2.40 - 4.42 m <sup>2</sup> /g Morphology: spherical
<b>Ag</b> AMCN143 7740-22-4 <b>Metal Powder, Flammable, UN 3089, 4.1 II</b>	Silver (Ag) Synthesis method: plasma CVD Purity: 99.5% (metal basis, O<10%) APS: 35 nm (TEM), max<100nm SSA: 30 - 50 m <sup>2</sup> /g Morphology: spherical Bulk density: 0.30 - 0.60 g/cm <sup>3</sup> True density: 10.5 g/cm <sup>3</sup> <b>Plasma CVD Synthesized</b>
<b>Ag</b> AMCN144 7740-22-4	Silver (Ag, metal basis) True density: 10.5 g/cm <sup>3</sup> Purity: 99.9% APS: 20 nm SSA: ~18-22 m <sup>2</sup> /g Color: black Morphology: spherical

<b>Ag</b> AMCN03 7440-22-4	Silver (Ag), (w/~0.2%PVP* for easy dispersion in water) Synthesis method: wet chemistry Purity: 99.9% APS: 30-50 nm (TEM) SSA: 5-10 m <sup>2</sup> /g Morphology: spherical Bulk density: 1.2-1.3 g/cm <sup>3</sup>
<b>Ag</b> AMCN04 7440-22-4	Silver (Ag) Purity: 99.95% APS: 1.5-2.5 um SSA: 0.4-0.8 m <sup>2</sup> /g Morphology: ~ spherical
<b>Ag</b> AMCN05 7440-22-4	Silver (Ag) Purity: 99.95% APS: 0.6-1.6 um SSA: 0.6-1.2 m <sup>2</sup> /g Morphology: ~ spherical
<b>Ag</b> AMCN06 7440-22-4	Silver (Ag)* Purity: 99.9% (metal basis) APS: 30-50 nm (TEM) SSA: 5-10 m <sup>2</sup> /g Morphology: spherical Surface coated with 2%wt oleic acid [formula: C <sub>18</sub> H <sub>34</sub> O <sub>2</sub> , structure: CH <sub>3</sub> (CH <sub>2</sub> ) <sub>7</sub> CH=CH(CH <sub>2</sub> ) <sub>7</sub> COOH ] for better dispersion in certain applications
<b>Ag</b> AMCN07 7440-22-4	Silver (Ag) Purity: 99.95% Thickness: 80-500 nm Length & width: 8-10 um SSA: 0.6-1.2 m <sup>2</sup> /g Morphology: flaky
<b>Ag</b> AMCN08 7440-22-4	Silver (Ag) Purity: 99.95% Thickness: 80-500 nm Length & width: 5-8 um SSA: 0.7-1.3 m <sup>2</sup> /g Morphology: flaky
<b>Ag</b> AMCN09 7440-22-4	Silver (Ag) Purity: 99.95% Thickness: 80-500 nm Length & width: 2-4 um SSA: 0.8-1.5 m <sup>2</sup> /g Morphology: flaky
<b>Ag</b> AMCN10 7440-22-4	Silver (Ag) Purity: 99.5% APS: thickness: ~20 - 80 nm width: ~(0.6-1.2) um length: ~(0.6-1.2) um SSA: 3 m <sup>2</sup> /g Color: pale gray Morphology: flaky

<b>Al</b> AMCN11 7429-90-5 UN1396	Aluminum (Al), (partially passivated) Purity: 99.9+% (metal basis) APS: 80 nm SSA: 13 m <sup>2</sup> /g Color: black Morphology: spherical True density: 2.70 g/cm <sup>3</sup> <b>Flammable Hazards, UN1396</b>
<b>Al</b> AMCN12 7429-90-5 UN1396	Aluminum (Al), Purity: 99.9% passivated APS: 800 nm SSA: 10 - 20 m <sup>2</sup> /g Color: black/grey Morphology: spherical
<b>Al</b> AMCN13 7429-90-5 UN1396	Aluminum (Al), Purity: 99.9% APS: 18 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Au</b> AMCN139 7440-57-5	Gold (Au) Purity: 99.5% APS: 35 nm (TEM) BET: 20 m <sup>2</sup> /g Morphology: spherical Bulk density: 1.0 g/cm <sup>3</sup> True density: 19.32 g/cm <sup>3</sup>
<b>Au</b> AMCN14 7440-57-5	Gold (Au) Purity: 99.99+% APS: 50 - 150 nm from SSA, visual bigger, hard aggregates. SSA: 3.3 m <sup>2</sup> /g Color: brown Morphology: spherical
<b>B</b> AMCN149 7440-42-8 UN3178	Boron powder (B) Purity: 99.9% APS: <80 nm True Density: 2.34 g/cc Morphology: nearly spherical
<b>C</b> AMCN15 7440-44-0	Diamond Black powder Purity: 52-85% Particle size: 4-25 nm SSA: 360-420 m <sup>2</sup> /g Color: black Morphology: spherical & flaky
<b>C</b> AMCN16 7440-44-0	Diamond Purity: > 95% APS: 3-5 nm SSA: 278-335 m <sup>2</sup> /g Color: gray Morphology: spherical
<b>C</b> AMCN17 7440-44-0	Diamond (Ultra Dispersed) Purity: > 97% APS: 3 - 6 nm, Max<10nm SSA: 200 - 450 m <sup>2</sup> /g Color: gray Morphology: spherical

<b>C</b> AMCN18 7440-44-0	Graphite powder Purity: 99.9% (metal base) Impurities: quartz + mica < 0.1%, D5: 400nm, D50: 450 nm, D100: 1um SSA: not measured, Particle morphology: flaky Color: black
<b>Co</b> AMCN19 7440-48-4 UN3089	Cobalt (Co) Purity: 99.8% (metal basis, O<10%) APS: 28 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Co</b> AMCN20 7440-48-4 UN3089	Cobalt (Co), passivated Purity: 99.8% (metal basis, O<15%) APS: 28 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Co</b> AMCN21 7440-48-4 UN3089	Cobalt (Co, carbon coated) Purity: 99.8% APS: 20 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical Bulk density: 0.08 - 0.20 g/cm <sup>3</sup> True density: 8.92 g/cm <sup>3</sup>
<b>Cr</b> AMCN140 7440-47-3 UN3089	Chromium Powder (Cr) (coated with 1-2% Oleic Acid) Purity: 99% APS: 30 nm Morphology: ~- spherical True density: 7.19 g/cm <sup>3</sup>
<b>Cu</b> AMCN22 7440-50-8 UN3089	Copper (Cu) Purity: 99.8% (metal basis) APS: 500 nm SSA: N/A
<b>Cu</b> AMCN23 7440-50-8 UN3089	Copper (Cu) <b>P.P. (partially passivated w/[O] ~10%.</b> It does not usually affect the major performances.) Purity: 99.8% (metal basis) APS: 25 nm SSA: 30 - 50 m <sup>2</sup> /g Color: black brown Morphology: spherical
<b>Cu</b> AMCN24 7440-50-8 UN3089	Copper (Cu, carbon coated) Purity: 99.8% (metal basis, O<10%) APS: 25 nm SSA: 30 - 50 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Cu</b> AMCN25 7440-50-8 UN3089	Copper (Cu, carbon coated) Purity: 99.8% (metal basis, O<10%) APS: 25 nm SSA: 30 - 50 m <sup>2</sup> /g Color: black Morphology: spherical

<b>Fe</b> AMCN26 7439-89-6 UN3089	Iron (Fe) <b>partially passivated</b> w/[O] ~10% for safe shipping Purity: 99.6% (metal basis, O<10%) APS: 25 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Fe</b> AMCN27 7439-89-6 UN3089	Iron (Fe), passivated Purity: 99.6% (metal basis, O<15%) APS: 25 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Fe</b> AMCN28 7439-89-6 UN3089	Iron (Fe, carbon coated) Purity: 99.6% (metal basis, O<10%) APS: 20 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Mo</b> AMCN29 7439-98-7 UN3089	Molybdenum (Mo) Purity: 99.5% (metal basis) APS: 85 nm SSA: 4.4 m <sup>2</sup> /g Color: black
<b>Ni</b> AMCN30 7440-02-0 UN3089	Nickel (Ni) Purity: 99.7+% APS: 30-50 nm SSA: 12 m <sup>2</sup> /g Color: black True density: 8.908 g/cm <sup>3</sup>
<b>Ni</b> AMCN31 7440-02-0 UN3089	Nickel (Ni) Purity: 99.9+% (metal basis, O<10%) APS: <70 nm SSA: 10-16 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Ni</b> AMCN32 7440-02-0 UN3089	Nickel (Ni), passivated Purity: 99.9+% (metal basis, O<10%) APS: 20 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Ni</b> AMCN33 7440-02-0 UN3089	Nickel (Ni, carbon coated) Purity: 99.9+% (metal basis, O<10%) APS: 20 nm SSA: 40 - 60 m <sup>2</sup> /g Color: black Morphology: spherical
<b>Nb</b> AMCN154 UN3089	Niobium Metal powder, 99.9% pure, 50 nm

<b>Si</b> AMCN34 7440-21-3 UN3089	Silicon (Si) Purity: > 98% APS: 50 -70nm (max<~~100nm) SSA: 30-50 m <sup>2</sup> /g Color: brown yellow Morphology: spherical Bulk density: 0.045 g/cm <sup>3</sup> True density: 2.33 g/cm <sup>3</sup> UN3089 4.1 III
<b>Si</b> AMCN35 7440-21-3 UN3089	Silicon (Si), Polycrystalline Purity: 99% APS: 50 nm SSA: 80 m <sup>2</sup> /g Bulk Density: 0.08 g/cm <sup>3</sup> Color: brown yellow
<b>Si</b> AMCN150 UN3089 4.1 III	Silicon (Si) Purity: > 98% APS: 30 - 50 nm SSA: 70-80 m <sup>2</sup> /g Color: brown yellow Morphology: spherical Bulk density: ~0.08 g/cm <sup>3</sup> True density: 2.33 g/cm <sup>3</sup>
<b>Ti</b> AMCN36 7440-32-6 UN2546	Titanium (Ti) Purity: 99% APS: 60-80 SSA: 13.8 m <sup>2</sup> /g Color: black gray Morphology: spherical
<b>Ti</b> AMCN37 7440-32-6 UN2546	Titanium (Ti) Purity: 99.9% trace metals basis Appearance: Black nanopowder APS: 40-60 nm SSA: ~20 m <sup>2</sup> /g Morphology: spherical
<b>W</b> AMCN38 7440-33-7 UN3089	Tungsten (W) Purity: 99% Surface coated with 0.3 wt% oleic acid APS: 80 nm SSA: ~10 m <sup>2</sup> /g Color: black Morphology: spherical Bulk density: 3.3-4.1 g/cm <sup>3</sup> True density: 19.3 g/cm <sup>3</sup>
<b>Zn</b> AMCN39 7440-66-6 UN1436	Zinc (Zn) Purity: 99.5% APS: 130 nm SSA: 6.4 m <sup>2</sup> /g Color: gray Morphology: spherical
<b>Zn</b> AMCN40 7440-66-6 UN1436	Zinc (Zn) Purity: 99.9+% (metal basis, O<10%)partially passivated APS: 100 nm SSA: 30 - 50 m <sup>2</sup> /g Color: black gray Morphology: faceted

## Non-oxide Compounds

<b>Formula</b> Stock # CAS #	Product Name, Purity Dimension [Particle Size (PS), Average Particle Size (APS), Outside Diameter (OD), Inside Diameter (ID)] Specific Surface Area (SSA) (m <sup>2</sup> /g) Particle Morphology Crystallographic Structure
<b>AlN</b> AMCN41 24304-00-5 UN2813	<b>Aluminum Nitride (AlN,                      hexagonal)</b> Appearance: Nanopowder Color: Off-white Purity (%): 99 Oxygen Content (%): <0.8 Particle Size (nm): 40 Specific Surface Area (m <sup>2</sup> /g): >78 Bulk Density (g/cm <sup>3</sup> ): 0.12
<b>BaTiO<sub>3</sub></b> AMCN136 12047-27-7	Barium Titanate (BaTiO <sub>3</sub> ) Purity: 99.8% APS: 10 nm Morphology: spherical True density: 5.85 g/cm <sup>3</sup>
<b>BaTiO<sub>3</sub></b> AMCN137 12047-27-7	Barium Titanate (BaTiO <sub>3</sub> ) Purity: 99.8% APS: 30 nm Morphology: spherical True density: 5.85 g/cm <sup>3</sup>
<b>BN</b> AMCN134 10043-11-5	Boron nitride (BN, hexagonal) Purity: 99% APS: 137 nm (determined from SSA) SSA: 19.4 m <sup>2</sup> /g
<b>LaB<sub>6</sub></b> AMCN135 12008-21-8	Lanthanum Boride (LaB <sub>6</sub> ) Purity: 99% Average particle size: 55 nm SSA: ~ 30 m <sup>2</sup> /g Morphology: spherical
<b>MoS<sub>2</sub></b> AMCN147 1317-33-5	Molybdenum sulfide (MoS <sub>2</sub> )* Purity: 99.0% APS: 10 nm SSA: 120 m <sup>2</sup> /g Morphology: nearly spherical Bulk Density: ~0.78 g/cm <sup>3</sup> True density: 4.80 g/cm <sup>3</sup>
<b>MoS<sub>2</sub></b> AMCN148 1317-33-5	Molybdenum sulfide (MoS <sub>2</sub> )* Purity: 99.0% APS: 50 nm SSA: 85 m <sup>2</sup> /g Morphology: nearly spherical Bulk Density: ~0.78 g/cm <sup>3</sup> True density: 4.80 g/cm <sup>3</sup>
<b>SiC</b> AMCN152 409-21-2	Silicon carbide (SiC, beta) Purity: 97% APS: 100 - 130nm SSA: 10 m <sup>2</sup> /g Color: grayish green

<b>SiC</b> AMCN42 409-21-2	Silicon carbide (SiC, beta) Purity: 95% APS: 50-60 nm Density: 3.216 g/cm <sup>3</sup> Color: grayish white Morphology: spherical
<b>SiC</b> AMCN43 409-21-2	Silicon carbide (SiC, beta) Purity: > 99+% APS: 45 - 65 nm SSA: 70 -90 m <sup>2</sup> /g Color: gray white Morphology: cubic
<b>SiC</b> AMCN44 409-21-2	Silicon carbide (SiC, beta) Purity: 99% APS: 20-40 nm SSA: > 90 m <sup>2</sup> /g Color: black Morphology: nearly spherical
<b>SiC</b> AMCN45 409-21-2	Silicon carbide (SiC, beta) Purity: > 97% APS: 10 nm (Max<20nm) SSA: 150-200 m <sup>2</sup> /g Color: black Morphology: nearly spherical
<b>SiC</b> AMCN141 409-21-2	Silicon Carbide (SiC, amorphous) Purity: > 99% Amorphous: 97-98wt%, crystalline: 2-3wt% APS: 15 nm SSA: ~ 90 m <sup>2</sup> /g Bulk Density: 0.08 g/cm <sup>3</sup> Morphology: nearly spherical Color: black
<b>SiC</b> AMCN46 409-21-2 <b>NOT AVAILABLE</b>	Silicon carbide, 97.5+% APS: (10±1) (100±15) nm SSA: 121-145 m <sup>2</sup> /g Color: black or gray black Crystallographic Structure: fibrous
<b>Si<sub>3</sub>N<sub>4</sub></b> AMCN47 12033-89-5 <b>NOT AVAILABLE</b>	Silicon nitride (Si <sub>3</sub> N <sub>4</sub> , alpha) Purity: 99% APS: 100 X 800 nm SSA: > 45 m <sup>2</sup> /g Color: light gray Morphology: whisker
<b>Si<sub>3</sub>N<sub>4</sub></b> AMCN48 12033-89-5	Silicon nitride (Si <sub>3</sub> N <sub>4</sub> , amorphous) Purity: > 96% APS: 30-70 nm SSA: 25 -55 m <sup>2</sup> /g Color: white Morphology: nearly spherical
<b>Si<sub>3</sub>N<sub>4</sub></b> AMCN49 12033-89-5	Silicon nitride (Si <sub>3</sub> N <sub>4</sub> , amorphous) Purity: > 98.5 % APS: 15 - 30 nm SSA: 103 - 123 m <sup>2</sup> /g Color: white Morphology: spherical



<b>TiB<sub>2</sub></b> AMCN145 12045-63-5	Titanium Boride (TiB <sub>2</sub> ) Purity: Ti > 68%, B >30% APS: 2-12 um Color: Grey True density: 4.52 g/cm <sup>3</sup>
<b>TiC</b> AMCN50 12070-08-5 <b>DISCONTINUED</b> <b>N/A</b>	Titanium carbide (TiC) Purity: > 98% APS: 50-80 nm SSA: 15 -25 m <sup>2</sup> /g Color: black Morphology: spherical & polyhedral
<b>TiC</b> AMCN50 12070-08-5 UN3178, 4.1 III, Flammable solid	Titanium Carbide (TiC) Purity: > 98+% APS: 80-130 nm, SSA: ~ 25 m <sup>2</sup> /g Color: black Morphology: nearly spherical Bulk density: ~0.5-0.6 g/cm <sup>3</sup> True density: 4.93 g/cm <sup>3</sup>
<b>TiC</b> AMCN51 12070-08-5 UN3178, 4.1 III, Flammable solid	Titanium carbide (TiC) Purity: > 98% APS: 30-40 nm, max<~80nm SSA: ~ 40 m <sup>2</sup> /g Color: black Morphology: nearly spherical
<b>TiC<sub>0.5</sub>N<sub>0.5</sub></b> AMCN52	Titanium carbonitride (TiC <sub>0.5</sub> N <sub>0.5</sub> ) Purity: > 97% APS: 50-80 nm SSA: 15 -25 m <sup>2</sup> /g Color: black Morphology: spherical & polyhedral
<b>TiC<sub>0.7</sub>N<sub>0.3</sub></b> AMCN53	Titanium carbonitride (TiC <sub>0.7</sub> N <sub>0.3</sub> ) Purity: > 97% APS: 50-80 nm SSA: 15 - 25 m <sup>2</sup> /g Color: black Morphology: spherical & polyhedral
<b>TiN</b> AMCN54 25583-20-4 UN3178	Titanium nitride (TiN) Purity: > 97% APS: 20 nm SSA: >80 m <sup>2</sup> /g Color: black Morphology: spherical
<b>TiN</b> AMCN151 25583-20-4 UN3178	Titanium nitride (TiN) Purity: > 97% APS: 100 nm SSA: >70 m <sup>2</sup> /g Color: black Morphology: spherical
<b>WC</b> AMCN55 12070-12-1 UN3178	Tungsten carbide (WC) Purity: 99.0% APS: 500 nm SSA: 1.1 m <sup>2</sup> /g Morphology: nearly spherical

<b>WC/Co</b> AMCN56 12070-12-1 7440-48-4 <b>UN3178</b>	Tungsten- carbide/cobalt [WC/Co(8wt%)] Purity: 99.5% APS: 60-250 nm SSA: 1.5 m <sup>2</sup> /g Morphology: nearly spherical
<b>WC/Co</b> AMCN57 12070-12-1 7440-48-4 <b>UN3178</b>	Tungsten carbide/cobalt [WC/Co(12wt%)] Purity: 99.5% APS: 60-250 nm SSA: 1.5 m <sup>2</sup> /g Morphology: nearly spherical True density: 14.3 g/cm <sup>3</sup>
<b>WC/Co</b> AMCN144 12070-12-1 7440-48-4 <b>UN3178</b>	Tungsten- carbide/cobalt [WC/Co(8wt%)] Purity: 99.5% APS: 60-250 nm SSA: 1.5 m <sup>2</sup> /g Morphology: nearly spherical Bulk density: ~3.9 g/cm <sup>3</sup> True density: 14.7 g/cm <sup>3</sup>

## Oxide Compounds

<b>Formula</b> Stock # CAS #	Product Name, Purity Dimension [Particle Size (PS), Average Particle Size (APS), Outside Diameter (OD), Inside Diameter (ID)] Specific Surface Area (SSA) (m <sup>2</sup> /g) Particle Morphology Crystallographic Structure
<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN58 1344-28-1	Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> , alpha) Purity: 99.97% APS: 150 nm SSA: 5-15 m <sup>2</sup> /g Color: white Morphology: nearly spherical
<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN59 1344-28-1 <b>Discontinued</b> <b>See Inframat</b> <b>100 nm</b> <b>material</b> Product # <b>26N-</b> <b>0811UPA</b>	Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> , alpha) (contains ~ 5-10% gamma, Fe>10ppm) Purity: 99.5% APS: 60 nm SSA: ~35 m <sup>2</sup> /g Color: white Morphology: spherical
<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN60 1344-28-1	Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> , alpha) (contains ~ 5-10% gamma, Fe>10ppm) Purity: 99.5% APS: 27-43 nm SSA: 35 m <sup>2</sup> /g Color: pale pink Morphology: nearly spherical

<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN61 1344-28-1	Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> , alpha) (contains ~ 5-10% gamma, Fe>10ppm) Purity: 99.5% APS: 27-43 nm SSA: 35 m <sup>2</sup> /g Color: pale pink Morphology: nearly spherical
<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN62 1344-28-1	Aluminum oxide (gamma), ≥ 99% APS: 40-80 nm SSA: 100-200 m <sup>2</sup> /g Color: milky white Morphology: spherical
<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN63 1344-28-1	Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> , gamma) Purity: 99.97% APS: 20 nm SSA: 180 m <sup>2</sup> /g Color: white Morphology: nearly spherical
<b>Al<sub>2</sub>O<sub>3</sub></b> AMCN64 1344-28-1	Aluminum Oxide (Al <sub>2</sub> O <sub>3</sub> , gamma) Purity: 99% APS: 10 nm SSA: > 160 m <sup>2</sup> /g Color: white Morphology: spherical Bulk density: 0.1 g/cm <sup>3</sup> True density: 3.7 g/cm <sup>3</sup>
<b>BaSO<sub>4</sub></b> AMCN65 7727-43-7 Toxic, 6.1, III, UN1564	Barium Sulfate (BaSO <sub>4</sub> ) Purity: 99% APS: < 500 nm Crystallite Size: 80 nm SSA: not measured Color: white
<b>BaSO<sub>4</sub></b> AMCN66 7727-43-7 Toxic, 6.1, III, UN1564	Barium Sulfate (BaSO <sub>4</sub> ) Purity: 99% APS: < 1,000 nm Crystallite Size: 100 nm SSA: not measured Color: white
<b>BaTiO<sub>3</sub></b> AMCN67 12047-27-7	Barium Titanate (BaTiO <sub>3</sub> , Cubic) BaO/TiO <sub>2</sub> : 0.999 - 1.001 Purity: 99.9% APS: 100 nm (from SEM) SSA: 10 - 11 m <sup>2</sup> /g Color: white Morphology: spherical
<b>Bi<sub>2</sub>O<sub>3</sub></b> AMCN68 1304-76-3	Bismuth oxide (Bi <sub>2</sub> O <sub>3</sub> , beta) Purity: 99.9+% APS: <210 nm SSA: 3.4 - 5.0 m <sup>2</sup> /g Color: yellow Morphology: spherical
<b>B<sub>2</sub>O<sub>3</sub></b> AMCN153 1303-86-2	Boron Oxide (B <sub>2</sub> O <sub>3</sub> ) Purity: 98% APS: 40-80 nm Morphology: spherical BET: 35 m <sup>2</sup> /g

<b>CeO<sub>2</sub></b> AMCN69 1306-38-3	Cerium oxide (CeO <sub>2</sub> ) Purity: 99.9% (REO) APS: 70-105 nm (from SSA) SSA: 8-12 m <sup>2</sup> /g Color: pale yellow Morphology: spherical
<b>CeO<sub>2</sub></b> AMCN70 1306-38-3	Cerium oxide (CeO <sub>2</sub> ) Purity: 99.9% (REO) APS: 32-40nm (from SSA) SSA: N/A Color: pale yellow Morphology: spherical
<b>CeO<sub>2</sub></b> AMCN71 1306-38-3	Cerium oxide (CeO <sub>2</sub> ) Purity: 99.9% (REO) APS: 15-30 nm SSA: 30-50 m <sup>2</sup> /g Color: pale yellow Morphology: spherical
<b>CoO</b> AMCN146 1308-06-1	Cobalt (II) Oxide (CoO) Purity: 99.5% APS: 50nm BET >30m <sup>2</sup> /g True density: 6.45 g/cm <sup>3</sup>
<b>Co<sub>3</sub>O<sub>4</sub></b> AMCN72 1308-06-1	Cobalt Oxide(Co <sub>3</sub> O <sub>4</sub> ) (Co content = 72 - 74%) Purity: 99% APS: 50-80 nm SSA: > 10 m <sup>2</sup> /g Color: black Morphology: nearly spherical
<b>Co<sub>3</sub>O<sub>4</sub></b> AMCN73 1308-06-1	Cobalt Oxide(Co <sub>3</sub> O <sub>4</sub> ) (Co content = 71.0-72.8%) Purity: 99.8% APS: 20-30 nm SSA: 40-70 m <sup>2</sup> /g Color: black Morphology: rods & spheres
<b>CoFe<sub>2</sub>O<sub>4</sub></b> AMCN74	Cobalt Iron Oxide (CoFe <sub>2</sub> O <sub>4</sub> ) Purity: 98% APS: 35-55 nm Color: black Morphology: spherical
<b>Co<sub>0.5</sub>Zn<sub>0.5</sub>Fe<sub>2</sub>O<sub>4</sub></b> AMCN75	Cobalt-Zinc Iron Oxide (Co <sub>0.5</sub> Zn <sub>0.5</sub> Fe <sub>2</sub> O <sub>4</sub> ) Purity: 99.5% APS: 30-50 nm Color: dark brown Morphology: nearly spherical
<b>CuO</b> AMCN76 1317-38-0	Copper Oxide (CuO) Purity: 99+% APS: 30-50 nm SSA: 13.1 m <sup>2</sup> /g Color: black Morphology: nearly spherical
<b>Dy<sub>2</sub>O<sub>3</sub></b> AMCN77 1308-87-8	Dysprosium oxide, 99.9%(REO) APS: (25±5) (225±25) nm SSA: 18-22 m <sup>2</sup> /g Particle Morphology: needle-like

	Crystallographic Structure: cubic
<b>Er<sub>2</sub>O<sub>3</sub></b> AMCN78 12061-16-4	Erbium oxide (Er <sub>2</sub> O <sub>3</sub> ) Purity: 99.9% (REO) APS: 41-53 nm (from SSA) SSA: 13-17 m <sup>2</sup> /g Color: pale pink Morphology: spherical
<b>Er<sub>2</sub>O<sub>3</sub></b> AMCN79 12061-16-4	Erbium Oxide (Er <sub>2</sub> O <sub>3</sub> ) Purity: 99.9% (REO) APS: 43 nm (from SSA) SSA: 16 m <sup>2</sup> /g Color: pink Morphology: nearly spherical
<b>Eu<sub>2</sub>O<sub>3</sub></b> AMCN80 1308-96-9	Europium oxide (Eu <sub>2</sub> O <sub>3</sub> ) Purity: 99.99% (REO) APS: 45-58 nm (from SSA) SSA: 14-18 m <sup>2</sup> /g Color: white Morphology: spherical
<b>Eu<sub>2</sub>O<sub>3</sub></b> AMCN81 1308-96-9	Europium Oxide (Eu <sub>2</sub> O <sub>3</sub> ) Purity: 99.995% (REO) APS: 58 nm (from SSA) SSA: 14 m <sup>2</sup> /g Color: white Morphology: nearly spherical
<b>Fe<sub>2</sub>O<sub>3</sub></b> AMCN82 1309-37-1	Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> , alpha) Purity: 98+ % APS: 20 - 50 nm SSA: > 50 m <sup>2</sup> /g Color: red brown Morphology: spherical
<b>Fe<sub>2</sub>O<sub>3</sub></b> AMCN83 1309-37-1	Iron Oxide (Fe <sub>2</sub> O <sub>3</sub> , gamma) Purity: 98% APS: 20 - 50 nm SSA: > 30 m <sup>2</sup> /g Color: red brown Morphology: spherical
<b>Fe<sub>3</sub>O<sub>4</sub></b> AMCN84 1317-61-9	Iron oxide, 98+ % APS: 20-30 nm SSA: > 60 m <sup>2</sup> /g Particle Morphology: spherical Crystallographic Structure: cubic
<b>Gd<sub>2</sub>O<sub>3</sub></b> AMCN85 12064-62-9	Gadolinium Oxide (Gd <sub>2</sub> O <sub>3</sub> ) Purity: 99.9+ % (REO) APS: 20-80 nm (from SSA) SSA: 10-40 m <sup>2</sup> /g Color: white Morphology: nearly spherical
<b>HfO<sub>2</sub></b> AMCN86	Hafnium Oxide (HfO <sub>2</sub> ) Purity: 99.95% APS: 100-200 nm SSA: not measured True density: 9.68 g/cm <sup>3</sup>

<b>In<sub>2</sub>O<sub>3</sub></b> AMCN87 1312-43-2	Indium oxide (In <sub>2</sub> O <sub>3</sub> ) Purity: 99.99% APS: 30 - 50 nm SSA: 15 m <sup>2</sup> /g Color: yellow Morphology: faceted (major) and rod (minor)
<b>In<sub>2</sub>O<sub>3</sub></b> AMCN88 1312-43-2	Indium oxide (In <sub>2</sub> O <sub>3</sub> ) Purity: 99.995% APS: 30 - 50 nm SSA: 15 m <sup>2</sup> /g Color: yellow with slight green Morphology: faceted (major) and rod (minor)
<b>In(OH)<sub>3</sub></b> AMCN89 20661-21-6	Indium hydroxide (In(OH) <sub>3</sub> ) Purity: 99.99% APS: 25 - 35 nm SSA: 57 m <sup>2</sup> /g Color: white Morphology: nearly spherical
<b>In<sub>2</sub>O<sub>3</sub>: SnO<sub>2</sub></b> AMCN90 50926-11-9	Indium tin oxide (In <sub>2</sub> O <sub>3</sub> :SnO <sub>2</sub> , 95wt%: 5wt%) Purity: 99.99% APS: 30 - 50 nm SSA: 20 m <sup>2</sup> /g Color: yellowish green Morphology: ~ spherical
<b>In<sub>2</sub>O<sub>3</sub>: SnO<sub>2</sub></b> AMCN91 50926-11-9	Indium tin oxide (ITO), In <sub>2</sub> O <sub>3</sub> :SnO <sub>2</sub> = 9:1 (wt), 99.99% APS: 30-50 nm SSA: 24 m <sup>2</sup> /g Particle Morphology: irregular Crystallographic Structure: cubic
<b>La<sub>2</sub>O<sub>3</sub></b> AMCN138	Lanthanum oxide (La <sub>2</sub> O <sub>3</sub> ) Purity: 99.99% (REO) APS: 15-30 nm SSA: 20-40 m <sup>2</sup> /g Color: white Bulk density: < 0.2 g/cm <sup>3</sup> True density: 6.51 g/cm <sup>3</sup> Mfg. method: sol-gel
<b>MgO</b> AMCN92 1309-48-4	Magnesium Oxide (MgO) Purity: 99% APS: 100 nm SSA: > 7 m <sup>2</sup> /g Color: white Morphology: polyhedral
<b>MgO</b> AMCN93 1309-48-4	Magnesium Oxide (MgO) Purity: 99.5% APS: 50 nm SSA: ~ 20 m <sup>2</sup> /g Color: white True density: 3.58 g/m <sup>3</sup>
<b>MgO</b> AMCN94 1309-48-4	Magnesium Oxide (MgO) Purity: 99% APS: 20 nm SSA: > 50 m <sup>2</sup> /g Color: white

	Morphology: polyhedral
<b>MoO<sub>3</sub></b> AMCN95 1313-27-5	Molybdenum oxide (MoO <sub>3</sub> ) Purity: 99.5% Average particle size: 370 nm (determined from SSA) Average crystallite size: 90 nm (determined from x-ray diffraction) SSA: 3.46 g/cm <sup>3</sup> Color: light blue Morphology: nearly spherical
<b>Nd<sub>2</sub>O<sub>3</sub></b> AMCN96 1313-97-9	Neodymium oxide (Nd <sub>2</sub> O <sub>3</sub> ) Purity: 99.9% (REO) APS: 49-64 nm (from SSA) SSA: 13-17 m <sup>2</sup> /g Color: pale violet Morphology: spherical
<b>Nd<sub>2</sub>O<sub>3</sub></b> AMCN97 1313-97-9	Neodymium Oxide (Nd <sub>2</sub> O <sub>3</sub> ) Purity: 99.9+% (REO) APS: 83 nm (from SSA) SSA: 10 m <sup>2</sup> /g Color: pale purple Morphology: irregular
<b>NiFe<sub>2</sub>O<sub>4</sub></b> AMCN98 12168-54-6	Nickel Iron Oxide(NiFe <sub>2</sub> O <sub>4</sub> ) Purity: 98% APS: 20-30 nm SSA: 59 m <sup>2</sup> /g Color: dark brown Morphology: nearly spherical
<b>Ni<sub>0.5</sub>Zn<sub>0.5</sub>Fe<sub>2</sub>O<sub>4</sub></b> AMCN99	Nickel-Zinc Iron Oxide (Ni <sub>0.5</sub> Zn <sub>0.5</sub> Fe <sub>2</sub> O <sub>4</sub> ) Purity: 98.5% APS: 10-30 nm Color: dark brown Morphology: nearly spherical
<b>NiO</b> AMCN100 1313-99-1	Nickel Oxide green (NiO) (Ni content = 77.5-78.8%) Purity: 99% APS: 100 nm SSA: > 6 m <sup>2</sup> /g Color: dark gray Morphology: spherical
<b>NiO</b> AMCN101 1313-99-1	Nickel oxide (Ni content = 71.5-75.0%), 99.8% APS: 10-20 nm SSA: 50-80 m <sup>2</sup> /g Particle Morphology: nearly spherical Color: black
<b>Sb<sub>2</sub>O<sub>3</sub></b> AMCN102 1309-64-4 UN1549	Antimony oxide (Sb <sub>2</sub> O <sub>3</sub> ) Purity: 99.9+% APS: 90 - 210 nm SSA: 15. 6 m <sup>2</sup> /g Color: white Morphology: spherical

<b>Sb<sub>2</sub>O<sub>3</sub></b> AMCN103 1309-64-4 UN1549	Antimony oxide, 99.8+% APS: 41-91 nm SSA: 26 m <sup>2</sup> /g Particle Morphology: nearly spherical Crystallographic Structure: cubic
<b>SiO<sub>2</sub></b> AMCN104 7631-86-9	Silicon Oxide (fused-SiO <sub>2</sub> , amorphous) Purity: 99.94+% D50: 2.8 um, D90 ~ < 6 um SSA: 4.6 m <sup>2</sup> /g pH: 6 Color: white Morphology: spherical
<b>SiO<sub>2</sub></b> AMCN105 7631-86-9	Silicon Oxide (fused-SiO <sub>2</sub> , amorphous) Purity: 99.94+% D50: 1.2 um, D90 ~ < 3 um, pH: 6 Color: white Morphology: spherical
<b>SiO<sub>2</sub></b> AMCN106 7631-86-9	Silicon Oxide (SiO <sub>2</sub> , quartz) Purity: 99.95+% D50 = 2.8 um, D90 ~ < 6 um SSA: 4.7 m <sup>2</sup> /g pH: 6 Color: white Morphology: spherical
<b>SiO<sub>2</sub></b> AMCN107 7631-86-9	Silicon Oxide (SiO <sub>2</sub> , amorphous) Purity: 99+% APS: 80 nm SSA: 440 m <sup>2</sup> /g Color: white Morphology: ~ spherical
<b>SiO<sub>x</sub></b> AMCN108 7631-86-9	Silicon Oxide (SiO <sub>x</sub> , x=1.2-1.6, amorphous) Purity: 99.5% APS: 15 nm SSA: 160 m <sup>2</sup> /g Color: white Morphology: spherical
<b>SiO<sub>x</sub></b> AMCN109 7631-86-9	Silicon Oxide (SiO <sub>x</sub> , x=1.2-1.6, amorphous) Purity: 99.5% APS: 10 nm SSA: ~640 m <sup>2</sup> /g Color: white Morphology: spherical, porous
<b>Sm<sub>2</sub>O<sub>3</sub></b> AMCN110 12060-58-1	Samarium oxide, 99.9% (REO) APS: 33-40 nm (determined from SSA) SSA: 18-22 m <sup>2</sup> /g Particle Morphology: nearly spherical Color: white or pale yellow
<b>SnO<sub>2</sub></b> AMCN111 18282-10-5	Tin oxide, 99.5% APS: 61 nm (determined from SSA) SSA: 14.2 m <sup>2</sup> /g Particle Morphology: faceted



	Crystallographic Structure: tetragonal
<b>SrCO<sub>3</sub></b> AMCN112 1633-05-2	Strontium Carbonate (SrCO <sub>3</sub> ) Purity: 99% APS: 30 - 80 nm SSA: 20 - 60 m <sup>2</sup> /g Color: white Morphology: spherical
<b>SrTiO<sub>3</sub></b> AMCN113 12060-59-2	Strontium titanate (SrO/TiO <sub>2</sub> : 0.996 - 1.005), 99.8% APS: 69-104 nm (determined from SSA) SSA: 12-18 m <sup>2</sup> /g Particle Morphology: spherical Crystallographic Structure: cubic
<b>Tb<sub>4</sub>O<sub>7</sub></b> AMCN114 12037-01-3	Terbium oxide, 99.95% (REO) APS: 46-60 nm (determined from SSA) SSA: 13-17 m <sup>2</sup> /g Particle Morphology: spherical Crystallographic Structure: cubic
<b>TiO<sub>2</sub></b> AMCN115 13463-67-7	Titanium Oxide (TiO <sub>2</sub> , anatase) Purity: 99% APS: 10 - 30 nm SSA: 200 -220 m <sup>2</sup> /g Color: white Morphology: spherical
<b>TiO<sub>2</sub></b> AMCN116 13463-67-7	Titanium Oxide (TiO <sub>2</sub> , anatase) Purity: 99.7% APS: 15 nm SSA: ~240 m <sup>2</sup> /g Color: white Morphology: spherical
<b>TiO<sub>2</sub></b> AMCN117 13463-67-7	Titanium oxide (rutile), 98.5% APS: 10×40 nm SSA: 160±30 m <sup>2</sup> /g Particle Morphology: needle-like Color: white
<b>TiO<sub>2</sub></b> AMCN118 13463-67-7	Titanium Oxide (TiO <sub>2</sub> , rutile) Purity: 99% APS: 50 nm SSA: 160 m <sup>2</sup> /g Color: white Morphology: spherical Bulk density: True density: 4.23 g/cm <sup>3</sup>
<b>WO<sub>3</sub></b> AMCN119 1314-35-8	Tungsten oxide, 99+% APS: 30-70 nm SSA: not measured Particle Morphology: nearly spherical Color: yellow
<b>Y<sub>2</sub>O<sub>3</sub></b> AMCN120 1314-36-9	Yttrium oxide, 99.9% (REO) APS: 32-36 nm (determined from SSA) SSA: 33-37 m <sup>2</sup> /g

	Particle Morphology: spherical Color: white
<b>Y<sub>2</sub>O<sub>3</sub></b> AMCN121 1314-36-9	Yttrium oxide, 99.995% (REO) APS: 29 nm (determined from SSA) SSA: 42 m <sup>2</sup> /g Particle Morphology: spherical Color: white
<b>ZnO</b> AMCN122 1314-13-2	Zinc oxide, 99.9+% APS: 90-210 nm SSA: 4.9-6.8 m <sup>2</sup> /g Particle Morphology: irregular Color: white
<b>ZnO</b> AMCN123 1314-13-2	Zinc oxide, 99.5% APS: 20 nm SSA: 50 m <sup>2</sup> /g Particle Morphology: nearly spherical Color: Milky white
<b>ZrO<sub>2</sub></b> AMCN124 1314-23-4	Zirconium oxide, 99.9% (metal basis excluding Hf) APS: 20-30 nm SSA: >35 m <sup>2</sup> /g Particle Morphology: spherical
<b>ZrO<sub>2</sub></b> AMCN125 1314-23-4	Zirconium Oxide, ZrO <sub>2</sub> Purity: 99.9% (metal basis excluding Hf) APS: 30 - 60 nm SSA: 15 - 40 m <sup>2</sup> /g Color: white
<b>ZrO<sub>2</sub></b> AMCN126 1314-23-4	Zirconium Oxide, Ytria Stabilized (ZrO <sub>2</sub> + 3% mol Y <sub>2</sub> O <sub>3</sub> ) Purity: 99.9%(metal basis excluding Hf, Hf < 3 wt%) Cryst. phases: 10-30% monoclinic + 70-90% tetragonal APS: 20 - 30 nm SSA: 30 - 60 m <sup>2</sup> /g Color: white Morphology: spherical Bulk density: 0.36-0.42 g/cm <sup>3</sup> True density: 5.88 - 5.91 g/cm <sup>3</sup>
<b>ZrO<sub>2</sub> + 3mol% Y<sub>2</sub>O<sub>3</sub></b> AMCN127 64417-98-7	Zirconium oxide, yttrium oxide stabilized, 99.9% (metal basis excluding Hf, Hf = 2-3 wt%) APS: 58-76 nm (determined from SSA) SSA: 13.5-17.5 m <sup>2</sup> /g Particle Morphology: spherical Crystallographic Structure: 70%monoclinic + 30% tetragonal
<b>ZrO<sub>2</sub> + 3mol% Y<sub>2</sub>O<sub>3</sub></b> AMCN128 64417-98-7	Zirconium Oxide, Ytria Stabilized (ZrO <sub>2</sub> + 3% mol Y <sub>2</sub> O <sub>3</sub> ) Purity: 99.9%(metal basis excluding Hf, Hf < 3 wt%) Cryst. phases: 10-30% monoclinic + 70-90% tetragonal APS: 20 - 30 nm

	SSA: 30 - 60 m <sup>2</sup> /g Color: white Morphology: spherical
<b>ZrO<sub>2</sub> + 8mol% Y<sub>2</sub>O<sub>3</sub></b> AMCN142 64417-98-7	Zirconium Oxide, Yttria Stabilized (ZrO <sub>2</sub> + 8% mol Y <sub>2</sub> O <sub>3</sub> ) Purity: 99.9%(metal basis excluding Hf, Hf=2-3 wt%) APS: 51 - 65 nm SSA: 16 - 20 m <sup>2</sup> /g Color: white Morphology: spherical Bulk density: 0.88 g/cm <sup>3</sup> True density: 5.77 - 5.83 g/cm <sup>3</sup>
<b>ZrO<sub>2</sub> + 8mol% Y<sub>2</sub>O<sub>3</sub></b> AMCN129 64417-98-7	Zirconium Oxide, Yttria Stabilized (ZrO <sub>2</sub> + 8% mol Y <sub>2</sub> O <sub>3</sub> ) Purity: 99.9% (metal basis excluding Hf, Hf=2-3 wt%) APS: 200-300 nm (from SSA, sub-micron <b>aggregate</b> ) SSA: N/A Color: white Morphology: spherical
<b>ZrO<sub>2</sub> + 8mol% Y<sub>2</sub>O<sub>3</sub></b> AMCN130 64417-98-7	Zirconium oxide, yttrium oxide stabilized, 99.9% (metal basis excluding Hf, Hf < 3 wt%) APS: 20-30 nm SSA: 30-60 m <sup>2</sup> /g Particle Morphology: spherical Crystallographic Structure: cubic
<b>ZrO<sub>2</sub> + 8%mol CaO</b> AMCN131 1314-23-4	Zirconium Oxide, Calcia Stabilized (ZrO <sub>2</sub> + 8% mol CaO) Purity: 99.9%(metal basis excluding Hf, Hf < 3 wt%) Cryst. stru.: tetragonal APS: 20 - 30 nm SSA: 30 - 60 m <sup>2</sup> /g Color: white Morphology: spherical
<b>ZrO<sub>2</sub> + 10%mol CeO<sub>2</sub></b> AMCN132 1314-23-4	Zirconium Oxide, Ceria Stabilized (ZrO <sub>2</sub> + 10% mol CeO <sub>2</sub> ) Purity: 99.9%(metal basis excluding Hf, Hf < 3 wt%) Cryst. phases: 30-50% monoclinic + 50-70% tetragonal APS: 20 - 30 nm SSA: 30 - 60 m <sup>2</sup> /g Color: light yellow Morphology: spherical