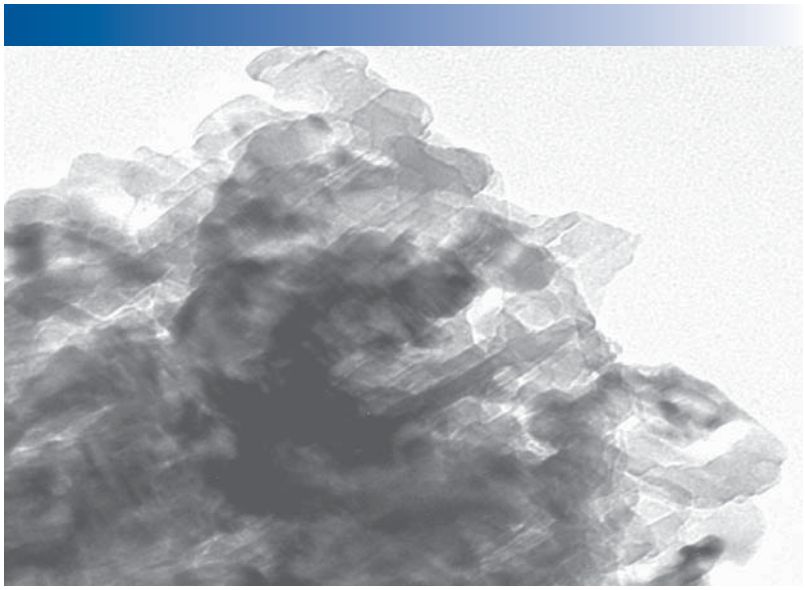
NanoActive

# Calcium Oxide

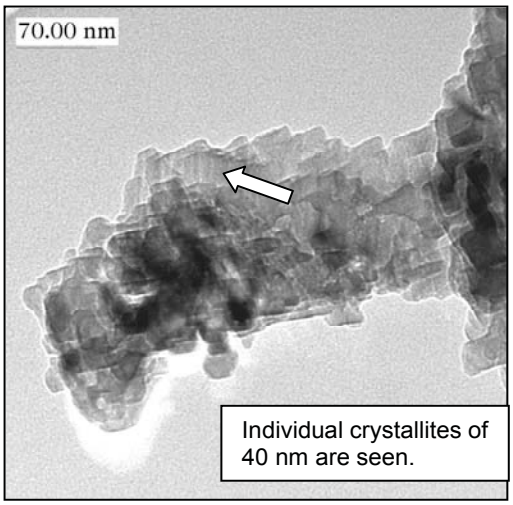


NanoActive CaO is produced using proprietary processes to obtain relatively high specific surface area material (over 20 $m^2/g$ vs. 1-2 $m^2/g$ for standard CaO) with strong affinity towards carbon dioxide and hydrogen sulfide.

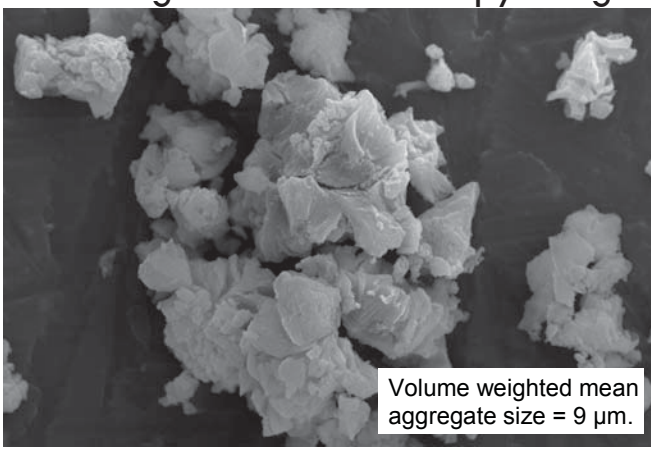
## Typical Properties

| | |
|---|---|
| Appearance/Color | White Powder |
| Specific Surface Area (BET) | ≥ 20 $m^2/g$ |
| Crystallite Size | ≤ 40 nm |
| Average Pore Diameter | 165 Å |
| Total Pore Volume | ≥ 0.1 cc/g |
| Bulk Density | 0.5 g/cc |
| True Density | 3.3 g/cc |
| Mean Aggregate Size, d0.5 | 4 µm |
| Ca Content (Based on Metal) | > 99.8% |

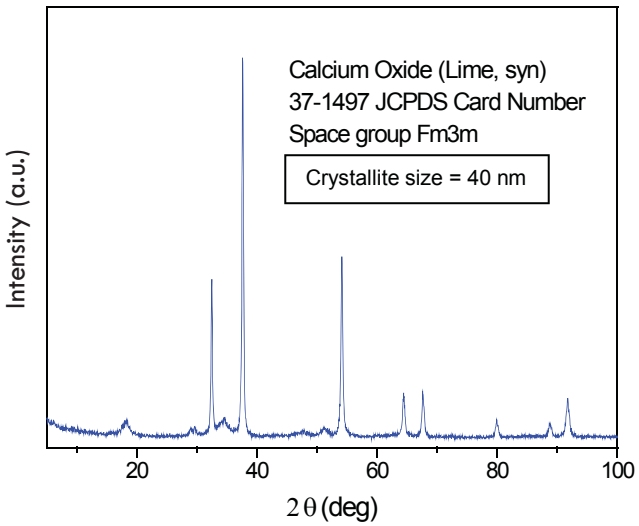
## Transmission Electron Microscopy Image




## Scanning Electron Microscopy Image




## Powder X-ray Diffraction Spectrum




NanoScale®
1310 Research Park Drive
Manhattan, KS, 66502 USA
888.537.0179 Phone
785.537.0226 Fax
www.NanoScaleCorp.com

# NanoActive

NanoActive materials exhibit a wide array of unusual properties. One of the unusual features is enhanced surface chemical reactivity. Just a few grams of a NanoActive material can have the surface area equivalent to that of a football field. Our NanoActive-S (suspensions) and NanoActive-G (granules) series provide the ability to adjust density and flow characteristics without compromising the high chemical reactivity of our NanoActive products.

| Potential Applications | Nanotechnology Benefit |
|---|---|
| Desiccant | Faster water adsorption due to considerably higher surface area |
| Elevated temperature hazardous waste treatment<br>• Destructive adsorption of halogenated, phosphorous and sulfur containing compounds | Lower temperature needed for destruction<br>Destruction capacity up to stoichiometric ratio |
| Flue gas treatment<br>• Sulfur dioxide removal<br>• Hydrogen sulfide removal<br>• Carbon Dioxide adsorption | Increased capacities (up to stoichiometric) over conventional materials<br>Faster kinetics |
| Insecticide and fungicide | Enhanced biocidal characteristics due to higher surface area<br>Enhanced converage due to lower material density |
| Odor reduction | Long term organic and inorganic (i.e., $H_2S$) odor control |
| Precursor<br>• Inorganics: calcium carbonate, phosphates (mono, di, and tri), fluoride, bromide, ferrocyanide, and nitrate<br>• Organics: calcium acetate, stearate, oleate, tartrate, lactate, citrate, benzoate, and gluconate | Synthesis of higher surface area materials products that have new uses (ex. calcium carbonate in nanocomposites for improved impact strength) |
| Pulp and Paper<br>• Coagulant in color removal from mill liquid wastes<br>• Alcohol, calcium lignosulfonate, and yeast recovery | Higher capacities |
| Water treatment<br>• Drinking water treatment (manganese, fluoride, organic tannins and iron removal)<br>• Water softening (carbonate removal)<br>• Sewage treatment (phosphate removal & pH adjustment) | Increased kinetics (ex. removal of carbonates, phosphorous compounds)<br>Enhanced capacity of contaminate removal |

Depending on Customer-specific needs NanoScale can supply its products as dry unfunctionalized powders, compacted powders (granules) or dispersions in various carrier fluids. The custom designed materials can be tested and characterized to meet Customer requirements.

## Order

| Product | Catalog Number | Quantity |
|---|---|---|
| NanoActive CaO | AC004-0025-00NS | 25 grams |
| | AC004-0100-00NS | 100 grams |
| | AC004-1000-00NS | 1 kilogram |
| NanoActive-G CaO | AC304-0025-00NS | 25 grams |
| | AC304-0100-00NS | 100 grams |
| | AC304-1000-00NS | 1 kilogram |

NanoScale Corporation 1310 Research Park Dr. Manhattan, KS 66502 785.532.0179 Phone 785.532.0226 Fax