



## NANOCAT® TITANIUM NITRIDE POWDER

### PRODUCT INFORMATION

Identification label: name: **TITANIUM NITRIDE POWDER**; chemical name: titanium nitride powder, chemical formula TiN. This material was prepared using electric explosion of titanium wire in ammonium NH<sub>3</sub> containing atmosphere.

### CHEMICAL COMPOSITION

Material: titanium nitride TiN – not lower 95% wt, unreacted titanium – 3%, the balance is adsorbed air, hydrocarbons and moisture.

### PHYSICAL AND CHEMICAL PROPERTIES

Appearance and color: gray powder. The bulk density is up to 2 g/cm<sup>3</sup>. Particles are irregularly shaped. . BET specific area of dry powder is 32 to 35 m<sup>2</sup>/g. Typical particles are shown in Fig. 1. Particle size distribution is shown in Fig. 2 Probabilistic (arithmetic mean) particle size  $\tilde{a}_n = 70$  nm; surface area mean size  $\tilde{a}_s = 117$  nm; mass mean size -  $\tilde{a}_m = 174$  nm. XRD analysis of dry powder has shown that the powder contains 95% titanium nitride. No metallic phases were found but there is 5% of unidentified phase but we suggest it may be TiO<sub>2</sub> - Fig.3. Unambiguous identification by XRD pattern was not possible since its high diffraction angle interfacial distances differ much from those by ASTM. Titanium nitride powder can find its application in making electrical ceramics and composites.

### HEALTH HAZARD

The powder is both explosion and fire safe. Titanium nitride may irritate respiratory tract. When swallowed, it slowly dissolves in stomach acid. No delayed action effect.

### SAFE HANDLING

Follow standard sanitary and hygiene rules.

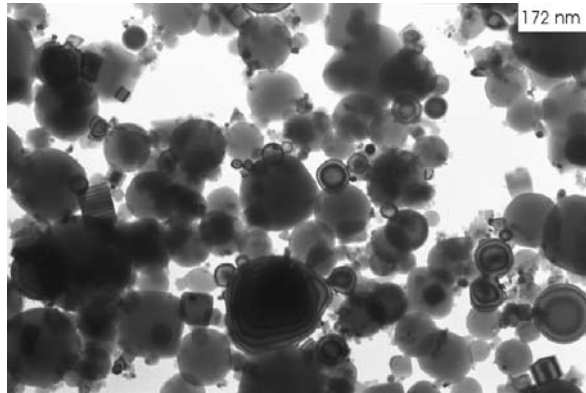


Fig.1 Typical TEM images of Titanium Nitride particles.

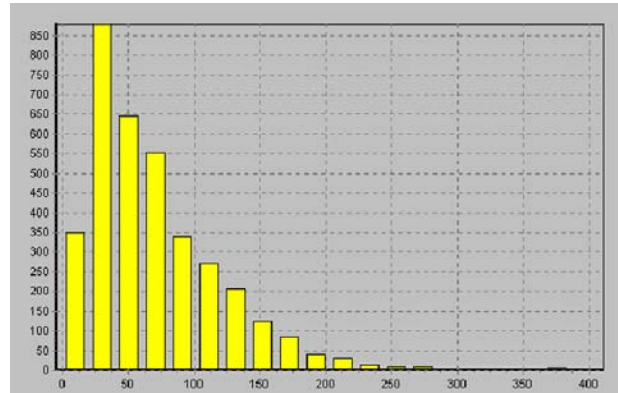


Fig.2 Particle size distribution.  
X-axis: particle size in nm;  
Y-axis: number of particles.

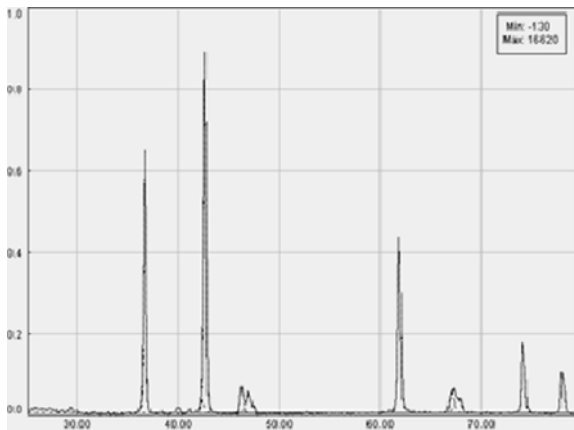


Fig.3 XRD pattern of Titanium Nitride powder.

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