



NANOCAT® INDIUM POWDER DRY

PRODUCT IDENTIFICATION

Identification label: **INDIUM POWDER DRY**. Chemical name: indium powder, chemical formula: In; readily flammable solid. This powder was prepared by electric explosion of a metallic wire in argon. It was then packaged in glass ampoules under inert atmosphere.

CHEMICAL COMPOSITION

Material: indium not less 98%, the balance is indium oxide and adsorbed gases - CH₄, CO₂, Ar, N₂. When exposed to air, metal content reduces to 92% with the balance of absorbed gases, indium oxide In₂O₃ and In(OH)₃.

PHYSICAL AND CHEMICAL PROPERTIES

Appearance and color: black or dark-gray powder. The bulk density is about 1 g/cm³. Particles of a powder start to conglomerate at temperature ≥ 30 °C. Dry particles may be of irregular shape and readily form microagglomerates. Appearance of the powder particles are shown in Fig.1. Particle size and mass distributions are shown in Fig. 2 a, b. Probabilistic (arithmetic mean) particle size $\tilde{a}_n = 89$ nm; surface area mean size $\tilde{a}_s = 114$ nm; mass mean size - $\tilde{a}_m = 142$. HRTEM shows many crystalline defects. BET surface area of dry powder is 4 m²/g. Powder is oxidized when heated to ~100°C in air with even more intensive oxidizing at melting temperature - 157°C. The powder is NOT water-reactive but reacts (dissolves) with acids. Ignites in air if exposed to open fire. Burning rate is 7.5 mm/s. Field of application: electronics.

HEALTH HAZARD

Toxicity: indium powder has neither toxic nor irritating effect. No carcinogenic effect was found for indium and its derivatives. However, some isolated cases of general poisoning were noted such as pains in bones and joints, nervous and gastrointestinal disorders, dental deterioration and general weakness. Recommended limiting concentration in USA is 0.1 mg/m³.

SAFE HANDLING

Use health protection measures commonly used in working with readily flammable solids. Wear respirators. Follow rules of industrial hygiene.

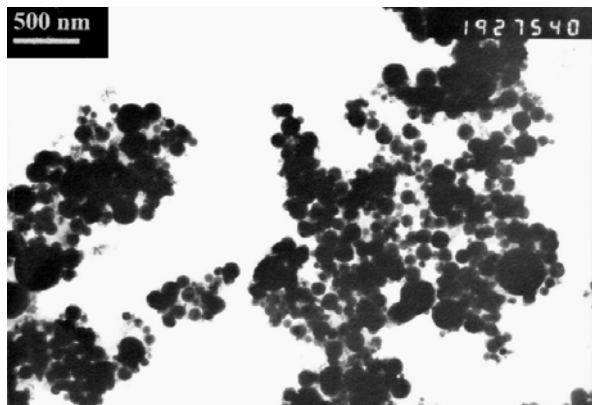


Fig.1 Typical TEM image of Indium particles.

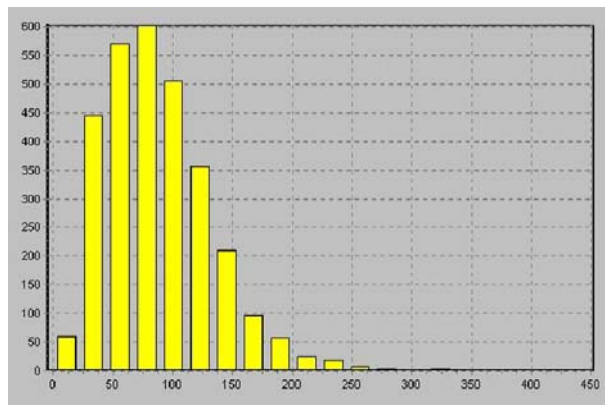


Fig.2 Size distribution of Indium particles. X-axis: particle size in nm; Y-axis: number of particles.

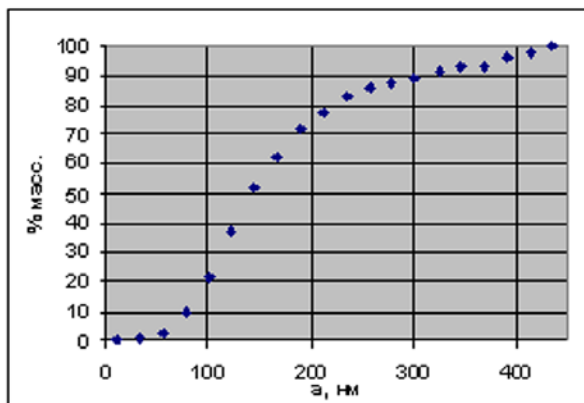


Fig.3 Mass distribution of Indium particles. X-axis: particle size in nm; Y-axis: number of particles.

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