

Article ID: 1003-7837(2005)02,03-0339-01

Ultra fine tantalum powder for advanced capacitors

Nebera A., Markushkin Yu., Azarov V., Ermolaev N.

(A. A. Bochvar Institute of Inorganic Materials, Moscow 123060, Russia)

Ultra fine tantalum and niobium powders are applicable in many areas of engineering. Of particular significance are high purity powders that are usable in production of high capacitance capacitors and superconductors. A method was developed and studied to produce tantalum powders with controllable specific surface. The method consists in reducing potassium fluorotantalate with sodium metal. The designed method allowed production of pilot batches of niobium powder via reducing potassium fluoroniobate with sodium. The specific surface of the produced powders as determined by BET method makes up 3.5-12.0 m²/g for tantalum and up to 16 m²/g for niobium. The basic metal content of the powders is 99.99 % mass. Using the methods of the X-ray diffraction analysis, scanning electron and atomic-force microscopy the structure and properties of primary nano-crystalline and fine crystalline powders as well as heat treatment effected changes in their structures and properties have been studied. The possibility has been demonstrated of their practical usage. At A. A. Bochvar VNIINM a semi-commercial production of tantalum powders has been managed. The powders of the capacitor class were produced having the capacitance up to 150 000 μC/g.