



Method for neutralization and utilization of galvanic slurries – wastes of chromium- and nickel-plating

(08 RU 86FG 2RWP)

Abstract

An SME from Saratov region, Russia, offers a new chemical agent (potassium polytitanate) for neutralization of galvanic slurries resulted from electrochemical processes of chromium- and nickel-plating. The obtained neutralization product is a raw material for making ceramics with good dielectric and mechanical properties. The company can offer technical documentation for galvanic sludge neutralization and manufacture of ceramic products, or deliver potassium polytitanate to interested partners.

Description

Galvanic slurries are very dangerous industrial wastes having a high class of danger. Chromium- and nickel-plating slurries are not so hazardous as zinc plating and copper coating wastes, since they do not contain cyanides. However, their utilization is hampered with several technical problems. Slaked lime and soda ash are usually used to neutralize sulfuric acid and transfer heavy metals ions into the deposit. This deposit is unsuitable for any technical application and should be land-buried in special areas as wastes containing great amount of heavy metals.

The company developed, patented and implemented the new material (potassium polytitanate) synthesis technology. This material is a fine powder with properties ensuring both neutralization of sulfuric acid aqueous solutions and adsorption of heavy metals (including chromium and nickel). Neutralized aqueous solution contain only K_2SO_4 (potassium sulphate). Nickel and chromium, as well as iron, zinc and copper ions usually contained in chromium-plating and nickel-plating waste materials are transferred into the deposit and contained there in the form of hydroxides and titanates.

Filtered and dried deposit is a raw material to produce ceramic materials characterized by a high level of dielectric and mechanical properties allowing various technical applications. Potassium polytitanate ensures reliable incorporation of heavy metal ions in the

ceramic structure; these ions are not transferred into the aqueous solutions even after a long boiling. Properties of the synthesized ceramic materials are independent of galvanic slurry's chemical composition; this allows manufacturing the ceramics based on raw materials obtained by neutralization of different galvanic slurries.

Innovations and advantages of the offer

Application of potassium polytitanate in treatment of galvanic slurries (wastes of chromium- and nickel-plating processes) allows both their neutralization and synthesis of raw materials suitable for manufacturing ceramic materials characterized with high exploitation properties and safety for further technical applications. 1. Manufacturing a commercial product (ceramics) based on toxic wastes which require considerable expenditures to be land-buried.

2. High exploitation characteristics of the synthesized ceramic materials : bending strength 140 MPa, microhardness 480 MPa, thermostability 1100°C, thermal shock stableness 1000°C (more than 10 thermal cyclings), thermal linear expansion factor $6,8 \cdot 10^{-6}$ 1/K.

3. Filtrates obtained by prolonged boiling of synthesized ceramic powder in neutral and acid aqueous solutions are free of Ni and Cr.

Current and Potential Domain of Application

Recycling and further use of wastes of galvanic productions



INDUSTRIAL MANUFACTURING, MATERIAL AND TRANSPORT

Technology Offer

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