UDC 541.138+541.135.3

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ELECTROCHEMICAL ACTION, POLISHING AND ELECTRODEPOSITION OF MOLYBDENUM, IN LOW TEMPERATURE FUSIONS

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There of is studied molybdenum electrochemical behaviour in low - temperature melts based on carbamide and acetamide, composition and structure of molybdenum complexes which formed during metal electrochemical dissolution in these melts. Electrochemical of method of polishing of the molybdenum surface was elaborated. There of is electrodeposited molybdenum in molten ammonium compounds using both of DC of and of AC of methods, morphology of deposit and features of processes are defined. The of deposited layer properties are changed from current density, current mode, duration of pulses, electrolyte composition and type of electrode.

Key of words: molybdenum, low-temperature melt, electrochemical behavior, poli - shing, electrodeposition

Intensive development of modern science and techniques in the last years tracks to increase of production for refractory metals to the increase of booty. Because the high cost of these metals, in practice a tendency was set of replacement of products from compact metals on details with the galvanically deposition coverage’s from them.

Analysis of achievements. Considerable attention is deserved by the electrodeposition of layer of molybdenum on the surface of metallic construction materials through high corrosive firmness and wonderful mechanical properties of molybdenum in many aggressive environments. For the most above-mentioned processes electrodepositions use high temperature molten salts, where they take place corrosion of product and electrode material. Therefore considerable attention is spared to research of methods of electrodeposition from the low temperature molten salt systems.

From the analysis of got cyclic voltammpergram of molybdenum electrode in a molten individual carbamide swims out, that molybdenum electrochemical dessolve in a molten carbamide and the process of his dissolution takes place without пасивації.

On ЕСП it is fixed stripes of transference of charge after 28000, 33000, 38000 см- 1, which characterize formation of isocyanides octahedral complexes as $[Mo(NCO_6)]$. The infra-red spectrums of rapid cooled fusion of carbamide after an electrolysis were taken off. In IR-spectrums characteristic frequencies of vibrations of NCO-group are fixed: $\upsilon_{as}(NCO)$ - 2200 sm^{-1}, $\upsilon_s(NCO)$ - 1332 sm^{-1}, $\sigma(NCO)$ - 625 sm^{-1} and frequencies of vibrations of connections of C-O and C-N in the molecule of carbamide. Results of IR-spectrums confirm formation of isocyanines complexes $[Mo(NCO_6)]$.

Coming from the form of cathode part of voltampergram of molybdenum electrode in a molten carbamide, it is possible to conclude, that complex connection is formed is not electrochemical active, because proceeding the ions of molybdenum on cyclogram is not observed.

Anodic dissolution of molybdenum takes place without passivation. On results of gravimetrical analysis it is set that at electrochemical dissolution molybdenum also, as well as in a molten individual carbamide, passes to fusion as ions of Mo(VI).

For confirmation of creation in fusion of carbamide- of NH_4Cl of ions of Mo(VI) there are executed the complex of spectroscopy researches. ЕСП is got at anodic dissolution of molybdenum in carbamide-chloride fusion bands transferences of charge are characterized at 27000, 32000, 37000 sm^{-1}. Coming from these electronic spectrums and comparing with literary data it is possible to draw conclusion that after electrochemical dissolution in fusion of carbamide of NH_4Cl a molybdenum passes to fusion as ions of Mo(VI), like dissolution in carbamide fusion.

At results of ЕСП, during anodic dissolution of molybdenum in molten acetamide at the density of current 10-100 $\mathrm{mA/sm}^2$, the stripes of transference of charge are fixed from oxygen on a metal at 32000 sm^{-1} and 36000 sm^{-1}, which can be attributed to the transitions: $1t_{1g}(\pi)\rightarrow 2t_{2g}(\pi^*)$ and $2t_{1u}(\pi + \sigma) \rightarrow 2t_{2g}(\pi^*)$.

On the basis of the executed researches the method of the electrochemical polishing of surface of molybdenum was worked out. Carbamides fusions can not be used for the electro polishing of molybdenum, because as a result of high speed dissolutions take place considerable charges of metal. Unlike carbamide fusions, in ацетамід-хлоридному molten electrolyte, as it was already marked, during picking-up of a few cycles of volt-amperes of curve there is passivation of surface of molybdenum, that and enables electrochemical planish metal. Thus application of acetamide-containing fusion as solvent, comparatively with carbamide, allows to reduce the temperature of process and conductivity of working fusion which results to diminishing of speed of dissolution of metal, what the charges of molybdenum during an electropolishing considerably due diminish.

For treatment of surface of molybdenum and its alloys used eutecticum fusion acetamide (the 88,7 mas. %) - NH_4Cl. For the additional diminishing of speed of treatment of metal and increase of degree of brilliance of surface of molybdenum the applied a surface-active matter by quantity 1.5-2.0 mass. %. Electropolishings of molybdenum executed in open-tank by reversible current with a density 200-400 $\mathrm{A/m}^2$ during 5 minutes of electrolysis.