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«Formation molybdenum coatings with low friction on the surface of aviation alloys with biomineralformation»

Belevtsev R.Y [1]., **Spivak, S.D[1], Kozlova I.A[2], Labunets V.F.[3]**

[1] *SI "Institute of Environmental of Geochemistry, NASU", Kyiv, Ukraine*
E-mail: belevtsev@ukr.net
[2] *Institute of Microbiology and Virology. D.K.Zabolotnogo NASU, Kyiv, Ukraine*
[3] *National Aviation University of Ukraine, Kyiv, Ukraine*

One of the objectives is to reduce the aviation industry tribological properties of friction parts of aviation alloys of Al and Ti through formation on their surface coatings with low hardness. One such technology is the formation of coatings with molybdenite **(MoS2)**. Were designed the new technology such covers in biofirm on the contact alloy and aqueous solutions with and bacterial cultures which significantly accelerate chemical reactions - **"tribobiomineralformation".** Experiments were performed with sulfate-reducing bacteria (SRB) as molybdenite formed under reducing conditions.

A series of experiments with sulfate reducing bacteria (SRB) preferably at a pH of about 7 , and Eh = -0,3-0,4V, with additive of molybdic acid in working solution . The experiment continued an average of 15 days. After these experiments were made X-ray spectral analysis (XSMA) of some coatings. The concentration of Mo-acid in the working solution was 2-5 ml / l. The content of molybdenite in the coating 10-40%, alum and hydroxides up to 30-40 % , the thickness of the mineral coating - 5-20 micrometers (microns).

Flexibility and strength alloys largely depends on their content and curing quenching or annealing. Chemical reactions with the formation of sulfide coatings have negative free energy of formation **(ΔG_{298}),** that is go to the right , but with a positive change in the volume of solid phases **(ΔV_S)**, that is sulfides occupy a larger volume than the alloy, which they replace .For laboratory researches of tribological properties of plates with aviation alloys obtained alum-molybdenite coatings on Al and Ti .The best tribological characteristics appeared in coating of on the titanium than aluminum

The following chemical reactions in the formation of mineral surfaces (corks) with molybdenite. On the aluminum:

$$Al+Mo^{3+}(w)+2H_2S(w)=Al^{+3}(w)+MoS_2+2H_2(g),\ \Delta G_{298} = -143\ kJ/mol$$

On the titanium:

$$Ti+Mo^{3+}(w)+2H_2S(в)=Ti^{+3}(w)+MoS_2+2H_2(g),\ \Delta G_{298} = -54 kJ/mol.$$

Prospects of formation strong molybdenite coverage may be connect with technologies of treatment cover of aviation alloys: its a thorough cleaning, deformation, annealing, coating and other special substances.