

X-ray Study of Titanium Coatings Made in Shaped Charge Jet Condition

Alexey Alexeyev^a, Sergey Gromilov^a, Sergey Kinelovsky^b, Irina Kireenko^a, ^a*Nikolayev Institute of Inorganic Chemistry. Novosibirsk, Russia.* ^b*Lavrent'ev Institute of Hydrodynamics. Novosibirsk, Russia.*
E-mail: alexeyev@gorodok.net

To improve hardness and corrosion resistance of a titanium surface, one technique of its treatment is the introduction of C, N and B into the metal crystal lattice. A technique for the application of coatings to titanium surfaces by a cumulative jet is suggested [1].

Some coatings were studied on a DRON-RM4 diffractometer. X-ray phase analysis was performed using the POWDER CELL 2.4 software [2]. The atomic coordinates and thermal parameters were assigned according to the literature data. The characteristics, such as quantitative phase relations, unit cell parameters, profile parameters (u , v , w), etc. were refined. The cubic and hexagonal modifications TiX , where $X = C, N, B$, were revealed in the samples investigated. The unit cell parameters $a = 4.23 - 4.31 \text{ \AA}$, $a = 2.97 - 2.98$ and $c = 4.75 - 4.80 \text{ \AA}$ were obtained for the cubic and hexagonal phases, respectively. The coating phase compositions appeared to be dependent on geometric characteristics of the cumulative device. The mean microhardness of the coating is 18 GPa, while the maximum value 39.5 GPa.

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[1] Gromilov S.A., Alexeyev A.V., Kinelovsky S.A., Kireenko I.B., *Combustion, Explosion and Shock Waves*, 2003, **39**, 6, 727-732. [2] Kraus W., Nolze G., *J. Appl. Cryst.*, 1996, **29**, 301.

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