STRUCTURAL STATE OF Cu-0.3%Mo CONDENSATES AFTER HEAT TREATMENT

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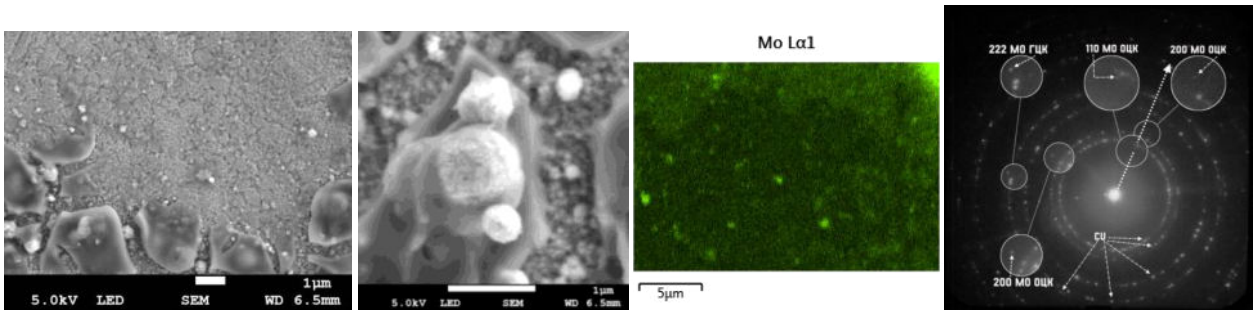
In recent decades, most attention among the problems of nanomaterials has been paid to the most important one - low thermal stability [1]. Composite materials based on copper and a refractory component (Ta, Mo, W) show promising results [2]. Therefore, it is advisable to continue studying their structural transformations under the influence of temperature

The objects of study were Cu-0.3at% Mo foils up to 50 μm thick, obtained by the PVD method at 450°C. Isothermal annealing at T=800°C for 30 minutes was performed. The foils were studied by scanning electron microscopy at Karlstad University (Sweden).

After annealing, the structure of the matrix metal consists of copper grains and spherical particles in the boundary region. They vary in size from 0.14 to 0.7 microns. According to the characteristic X-ray recording (Fig. 1, c), only the smallest of them are molybdenum particles. This confirms the previous results about the mechanism of evolution of the structural state of molybdenum from the adsorption layer of atomic thickness to partially coherent FCC particles recorded by TEM (Fig. 1.d), followed by the formation of molybdenum's own BCC particles on the surface of the matrix grains.



a) b) c) d)

Figure 1 - Electron microscopic images of Cu-0.3at%Mo taken in high-resolution SEM (a, b) and EDS (c) after annealing; d) in TEM diffraction mode in the initial state.

References:

1. Edelstein, A. S., Murday, J. S., & Rath, B. B. (1997). Challenges in nanomaterials design. Progress in materials science, 42(1-4), 5-21.

2. Riaboshtan, V., Zubkov, A., Zhadko, M., Zozulya, E., & Zubarev, E. (2024). "The influence of the condensation rate on the structure of Cu-Mo pseudoalloys." Low Temperature Physics 50.1 (2024): 44-47.