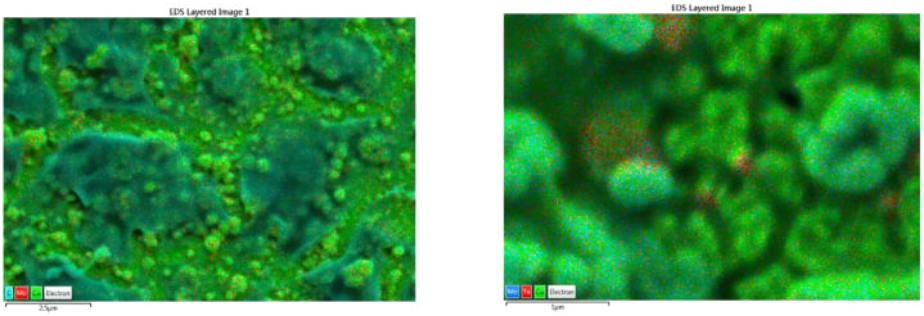
THE STUDYING OF THE LOCATION OF SECOND-PHASE PARTICLES IN COPPER PSEUDO-ALLOYS BY ENERGY DISPERSIVE SPECTROSCOPY

Riaboshtan V., Zubkov A., Pinchuk N.
National Technical University
"Kharkiv Polytechnic Institute", Kharkiv

The use of nanomaterials in manufacturing is limited by their high tendency to growth of structural components and loss of properties [1]. Previous studies have shown the possibility of significantly increasing the ability to resist thermal effects by alloying the matrix metal with refractory immiscible components. The aim of this work is to study their distribution in the copper matrix.

The objects of research were Cu-0.3at%Mo foils up to 50 μm thick, obtained by the PVD method at a temperature of 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).



a) b)

Figure 1 - Image in the mode of characteristic X-ray radiation registration: a) sample 1; b) sample 2

The analysis of characteristic X-ray traces shows that particles of both molybdenum and tantalum in the copper matrix are arranged in such a way that they describe areas free of these impurities (Fig. 1). At the same time, a difference in the formation of tantalum clusters was also recorded.

The size of the zones free of tantalum particles is in the range of 300 - 350 nm, which is 100 nm larger than the grain size in the initial state, indicating that they are formed by the effect of imitation [2].

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. Гапонова О.П., Будник А.Ф. (2014). Сталі та сплави з особливими властивостями. Видавництво СумДУ -http://essuir.sumdu.edu.ua/handle/123456789/34052