

## STUDY OF PHASE FORMATION IN LAYERED SYSTEM BE-FE

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The Fe-Be system was chosen as a model for further consideration of the stainless steel–beryllium system, which is a promising reactor material. The regions of existence of phases on the Fe-Be phase diagram, slightly varying with temperature (except for a solid solution of Beryllium in Iron  $\alpha$ -Fe(Be)) in the temperature range 500÷1000°C and a wide two-phase region  $\alpha$ -Fe(Be)+FeBe<sub>2</sub> [1] made it a convenient model system.

The two-layer system Be(2  $\mu$ m)–Fe(10  $\mu$ m) was obtained by magnetron sputtering of Beryllium onto prepared armco-Iron foils. Sequential thermal annealing in vacuum was carried out at a temperature of 720°C. Figure 1 shows the spectrum of the layered system after 10 hours of annealing. The dotted line shows the spectrum of <sup>57</sup>Fe nuclei in  $\alpha$ -Fe. It can be seen that the experimental spectrum is a sextet with widened lines. At the same time, no additional lines are observed. Consequently, we can talk about the formation of a solid solution of Be atoms in  $\alpha$ -Fe. In [2], it was revealed that the substitution of 1 Iron atom with a Beryllium atom in the nearest environment of the central Iron atom of an elementary cell in the  $\alpha$ -Fe lattice leads to a decrease in the hyperfine field by 23.4 kOe. Figure 1 shows the positions of the sextet lines corresponding to <sup>57</sup>Fe atoms without Be atoms in the nearest environment (H<sub>0</sub>), with one (H<sub>1</sub>) and two (H<sub>2</sub>) Be atoms.

Using the MSTools software package [3], the Mossbauer spectra of phases present on the equilibrium diagram of Fe-Be binary system were modeled according to the [4] method. In this case, the parameters of the Mossbauer phase spectra from [5] were used.

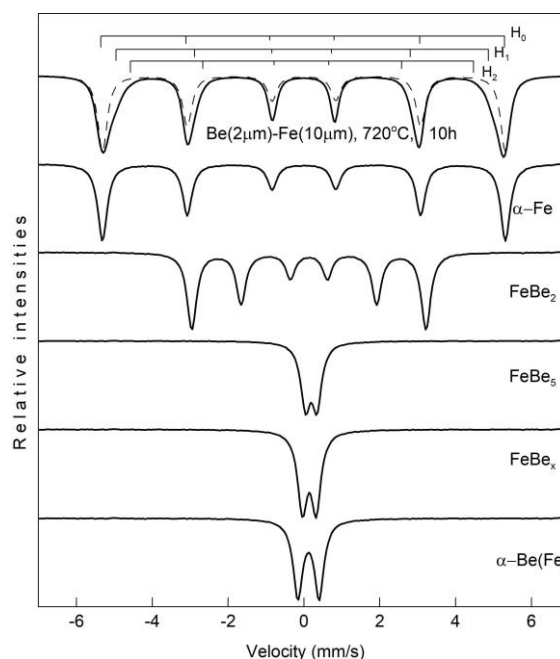


Fig.1. Mossbauer spectrum of Layered system Be-Fe and the simulated spectra of Fe-Be system's phases

As a result of the studies of thermally induced phase formation with a layered Be(2  $\mu$ m)–Fe(10  $\mu$ m) system after annealing at 720°C, the formation of a solid solution of  $\alpha$ -Fe(Be) was revealed. The Mossbauer spectra of various phases of the Fe-Be binary system were modeled.

### REFERENCES

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