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THE MODELING OF ALUMINUM LAYER FORMATION ON NICKEL ALLOYS BY BI-VELOCITY METHOD.

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Abstract. In this paper the model of interdiffusion in multiphase system is discussed and used to simulate a formation of single-phase layers in a binary system and formation of both single- and two-phase layers during diffusion in a ternary system. The model base on the bi-velocity method, in which material velocity and velocities of individual components are considered and allows calculating concentration profiles, spatial distribution of entropy-production rate and diffusion path.

It takes into consideration the mass transport in all phases present in the system (likewise throughout the both phases within two-phase zone). In particular, a formation of two-phase zones by isothermal diffusion is predicted. By using phase-field parameter (here volume fractions of the phases), a smooth transition between neighbouring, single and two – phase, regions is possible and the mass transport equations remain valid when the phase boundaries are crossed. The aluminization of nickel and its superalloy, MAR-M200+Hf, by CVD is studied experimentally and simulated numerically.