

The microstructure, diffusion and phase transformations in aluminum-steel clad sheet were studied within the thesis by means of light optical microscopy, electron microscopy, resistometry and positron annihilation spectroscopy. Results of experimental methods were supplemented by finite element method employed for evaluation of electrical resistivity and simulation of diffusion between steel and aluminum.

Several annealing experiments were carried out. The effective interdiffusion coefficient was evaluated by Boltzmann-Matano method from measured concentration profiles through the interface. Formation of an interfacial intermetallic phase was studied and orthorhombic phases $\text{Al}_{13}\text{Fe}_4$ and Al_5Fe_2 were identified present in the layer. Surprising results were obtained from the in-situ annealing in TEM (SEM) which go against the results found in a recent literature – the interfacial layer grows towards steel layer.