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INTERDIFFUSION IN ALUMINIUM –STEEL CLAD

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Bonding of aluminium and steel into one single material –an aluminium-steel clad – represents an excellent composite material, which provides high potential for applications in automobile industry by combination of properties of respective materials –high stiffness and strength of steel and durability, corrosion resistance, thermal capacity and high specific strength of aluminium. microstructure. Optimal process conditions during clad strips production should result in the formation of a continuous diffusion layer of several Fe-Al phases. However, such layer may reduce the bonding strength and formability of the material. Diffusion and phase transformations in aluminium - steel clad sheet prepared by twin-roll casting were studied by means of light optical microscopy, electron microscopy and resistometry. Effective interdiffusion coefficient was evaluated by Boltzmann-Matano method from measured concentration profiles through the interface. Simulated results were in a direct contradiction with in-situ TEM/SEM observations showing surprisingly a formation of Fe-Al phases in the steel layer. Results confirm that a simple diffusion driven model could not cover complex processes occurring at the interface.

Presenter: KŘIVSKÁ B. (Charles University, Faculty of Mathematics and Physics)

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