

PATIPHAN JUIJERM : INFLUENCE OF REDUCER ON COATING
OF STEEL WITH VANADIUM CARBIDE BY TD PROCESS. THESIS
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The objective of this thesis was to study influence of reducer on coating of D2 and H13 steel with vanadium carbide in molten borax salt bath under ambient atmosphere by TD process. The ferrovanadium content for this experiment was 15 weight percent. The reducers for this experiment were ferrosilicon, ferrotitanium and ferromanganese and reducer content was varied in the range of 1 - 10 weight percent. The coating temperature was 1000 °C. The coating time was varied in the range of 1 - 9 hours. Thickness of coating layer was investigated by optical microscope and scanning electron microscope and was measured by Image Analyzer. The coating layer was analyzed by EDS and XRD. It was found that vanadium carbide coating was occurred by reducer addition. Coating layer occurred when the reducer content was ferrosilicon at 3 weight percent and its thickness was 6.98 microns. For 10 weight percent content of ferrotitanium and ferromanganese, the thickness were 6.09 and 4.06 microns respectively. Thickness of coating layer increased with increasing coating time. Layer thickness grew up linearly in a function of square root of coating time in hour. This meant that thickness of coating layer was controlled by diffusion process. The D2 steel, which has more carbon content than H13 steel, can be coated with vanadium carbide with thicker layer than H13.

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