Study on Corrosion Resistance of GI coating after Heat Treatment

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Abstract Hot stamping steel is the largest amount of high strength steel products used in white body. In order to improve the corrosion resistance and oxidation resistance of hot forming steel, a metal coating is usually hot-dipping on the surface of hot stamping steel, such as aluminum silicon coating (AS) and galvanized coating (GI). In order to study the effect of different heating time on the corrosion resistance of GI coating, the 22MnB5 steels with GI coating were heated under 3 min to 10 min at 900℃. The corrosion resistance of the coating was evaluated by electrochemical test and neutral salt spray test. The results show that GI coating was composed of Fe_3Zn_{10} phase and α-Fe (Zn) phase after heating at 900℃. With the increase of heating time, the Fe content in the coating increased gradually, and the impedance of the coating increased gradually. After 20 days of neutral salt spray test, white rust still appeared on the surface of the coating, and there was no corrosion to the substrate. During the corrosion process, the zinc-rich phase was corroded first. In conclusion, after heatment the GI coating still has good corrosion resistance, but the cathodic protection performance of the coating decreases with the increase of heating time.

Keywords GI coating; heat treatment; corrosion resistance