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Project Title

Investigation of Variations in Zinc Coating Thickness with Different Galvanized Metal Thicknesses

Abstract

Objectives/Goals
To investigate whether the thickness of zinc coating varies with thickness of different galvanized metal samples.

Methods/Materials
Eleven different galvanized metal samples of thicknesses varying between 1/4 inch to 26 gauge were obtained from B&B metal surplus.Each metal sample was 5cm by 5cm.First the mass of a metal sample was determined.Taking appropriate precautions a known volume of 6M HCL acid was used to immerse this metal sample in a 200ml beaker. Once the bubbling of the chemical reaction slowed significantly the metal sample was removed,rinsed with water,dried thoroughly,then reweighed.This procedure was repeated 4 times for each of the different metal thicknessess.

Results
Thickness of zinc was calculated using equation:t=difference in mass(zinc)/(density x area).Following results were obtained
1/4 inch t=0.011cm,3/16 inch t=0.008cm,10 gauge t=0.003cm,12 gauge t=0.005cm,14 gauge t=0.003cm,16 gauge t=0.003cm,18 gauge t=0.003cm,20 gauge t=0.003cm,22 gauge t=0.003cm,24 gauge t=0.003cm,26 gauge t=0.003cm
Number of zinc atoms were also calculated using the equation:
$(2)t/(4.17 \times 10$(to the power of -10)
The 10,14,16,18,20,22,24,26 gauge samples all lost average of 1.439×10(to power of 7)atoms of zinc during the chemical reaction
1/4 inch lost 5.276×10 zinc atoms,3/16 lost 3.837×10 zinc atoms ,12 gauge lost 2.39×10 zinc atoms(all results to the power of 7)

Conclusions/Discussion
My hypothesis was accurate in that the zinc coating does vary with thickness of metal samples. During the corrosion,the solution bubbled vigorously indicating that hydrogen gas was released.Any errors may be due to removing the metal from the acid too quickly as this would mean that not all of the zinc had time to dissolve.However waiting too long could mean eventual corrosion of the steel.

Summary Statement
To find if there is variation of zinc coating thickness with different thicknesses of galvanized metals.

Help Received
B&B metal supply provided the galvanized metal samples.