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COPPER CORROSION IN ACIDS

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Abstract

Acid concentration is increases corrosion rate reaches a maximum another decreases .This is due to the fact that at very high concentration of acids ionization is reduced Because of this many of the common acids such as acetic acid, sulfuric, hydrofluoric as other are virtually inert in the pure state or 100% concentration at moderate temperature of grains Other differences in the metal can be chemical, metallurgical or mechanical in nature Examples arc impurities such as oxides and other inclusions mill scale, orientation dislocation arrays, differences in composition of the microstructure, precipitated phases, localized stresses, scratches and nicks. Highly polished surfaces are used in only special cases. Very pure materials are more corrosion resistant than commercial materials.

Keywords: *Corrosion, Alloy, Acid concentration, Grains.*

Introduction: Copper is different from most other metals' ill that it combines corrosion resistance kit rows electrical and heat conductivity. Formability. Machine ability and strength then alloyed except high temperatures. Copper exhibits good resistance to urban, marine and industrial atmospheres and water. Copper is a noble meml2 and hydrogen evolution is not usually a part of the corrosion process. For this reason, it is not corroded by acids olden oxygen or other oxidizing agents are present (nitric acid). For example reaction Between copper and sulfuric acid is not thermodynamically possible, but corrosion proceeds in the presence of oxygen and the products are copper sulfate and writer. Reduction of oxygen to form hydroxide ions is the predominant cathodic reaction time, Is, and its alloys. Copper-base alloys' are resistant to neutral and slight Ix alkaline dilution. With the exception of those containing excess ammonia which cause stress corrosion and sometimes rapid general attack.

In strongly reducing conditions at high temperatures (300-400°C) copper alloys.' are often superior to stainless steels and gain less alloys. The most common copper base alloys are brass (Cu4-7.n). bronze cupronickel (Cu_Ni) Copper and brasses are subjected to erosion corrosion or impingement attack. The bronzes and Aluminium brass are much better in this respect. The bronzes are stronger and harder. The cupro-nickel with small iron additions are also superior in erosion corrosion resistance. Copper and copper alloy's are available in duplex tubing (inside one metal, outside another) in combination with steels, aluminum and stainless steels.

EXPERIMENTAL BACK GROUND:

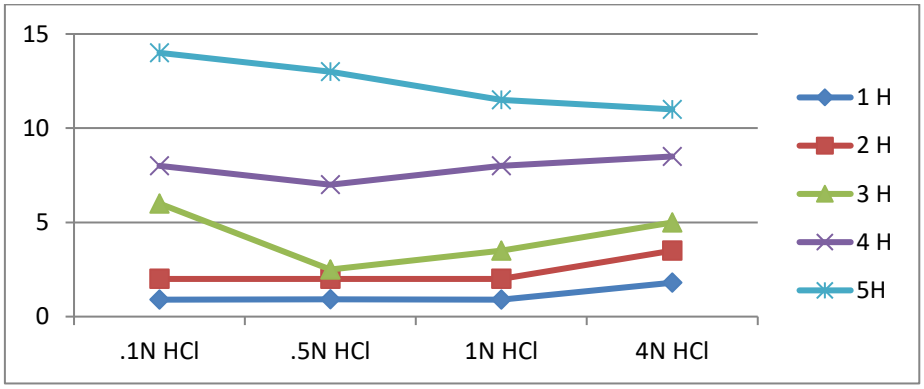
With this background the Corrosion study on copper metal has been carried out under different media viz acids, bases. Neutral organic solvents etc. and the study has en correlated to the available literature. Rectangular Copper plates are used throughout the experiment solutions of different concentrations viz 0.1. 0.5.1N.4N have been prepared and standardized. The copper plates are clipped in the (effective solutions for 1 to 5 hours and the corrosion study is measured in the form of weight loss basis. The results are given in the 'Tables. The potentials have been measured using Copper electrode as the Reference electrode.

DISCUSSION AND RESULTS:

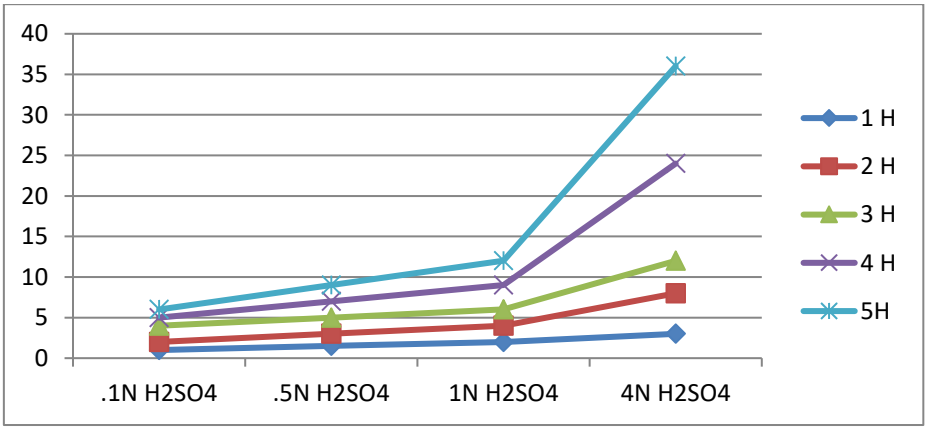
Weight loss of Copper (mg)

S No	MEDIUM	0.1N	0.5N	1N	4N
1	HCl	12	12.5	11	12.25
2	H_2SO_4	07.5	10.24	14.5	34.00
3	HNO_3	08	17	12	74.50

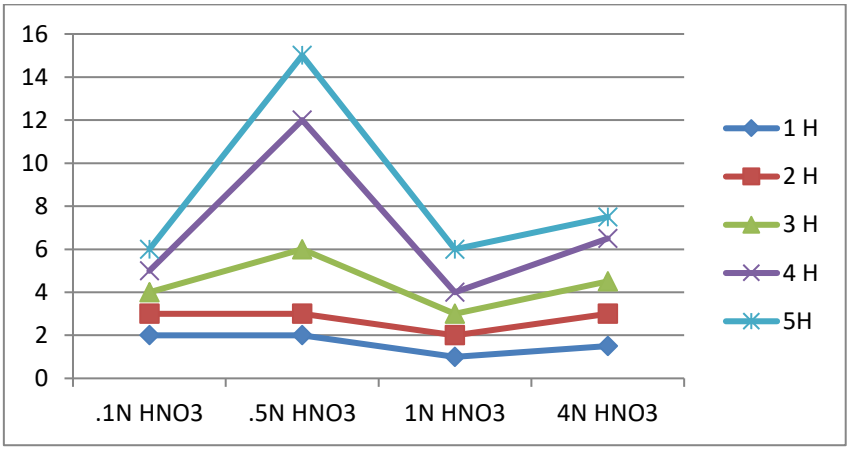
Weight Loss(mg)	1 Hour	2 Hour	3 Hour	4 Hour	5 Hour
0.1N HCl	0.90	2.5	6	8	14
0.5N HCl	0.92	2	2.5	7	13
1N HCl	0.90	2	3.5	8	11.5
4N HCl	1.8	3.5	5	8.5	11



Weight Loss(mg)	1 Hour	2 Hour	3 Hour	4 Hour	5 Hour
0.1N H_2SO_4	1	2	4	5	6
0.5N H_2SO_4	1.5	3	5	7	9
1N H_2SO_4	2	4	6	9	12
4N H_2SO_4	3	8	12	24	36



Weight Loss(mg)	1 Hour	2 Hour	3 Hour	4 Hour	5 Hour
0.1N HNO_3	2	3	4	5	6
0.5N HNO_3	2	3	6	12	15
1N HNO_3	1	2	3	4	6
4N HNO_3	1.5	3	4.5	6.5	7.5



From the above results the lot low i nu conclusions have been drawn .The corrosion of copper in acidic medium is considerably lower than that of iron. This is due to the noble act um of Copper on the electrochemical series, but in mine medium sodium hydroxide, potassium hydroxide the rate or corrosion is more than Iron. The potential measured copper against calomel electrode are also less than that of Sunder different media. This is also in support of the noble behavior of the metal. Corrosion of copper on 4N HN O3 is quite higher. The order of rate of corrosion are as follows $HN0_3$>$H2S0_4$> H Cl corrosion in alkali is also quite high.

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