LITERATURE REVIEW:

Mass loss and thermometric methods have been to study the corrosion inhibitory effect of synthesized Schiff’s bases viz. N-(furfurilidine)-4–methoxy aniline (SB₁), N-(furfurilidine) –4 – methyl aniline (SB₂), N-(salicylidine) – 4 – methoxy aniline (SB₃), N-(cinnamalidine)–4–methoxy aniline (SB₄), N-(cinnamalidine)–2–methylaniline (SB₅) on mild steel in sulphuric acid solutions. Results show that both methods have good agreement with each other and inhibition efficiency depends upon the concentration of inhibitor as well as that acid.

Mass loss techniques have been employed to study the corrosion inhibition of some newly synthesized Schiff’s bases viz. N-4-(Diethyl amino) salicylidine-2-amino-5-chloropyridine (SB₁), N-(4-ethylbenzalidine) -2-amino-5- chloropyridine (SB₂), N-(4-ethylbenzalidine) -2-amino-5- bromopyridine (SB₃), N-4-(Diethyl amino) salicylidine-2-amino-5-bromopyridine (SB₄) for mild steel in HCl and H₂SO₄ solutions. Results of inhibition efficiency from the mass loss techniques show that Schiff’s bases are good inhibitor in acidic solutions.

Weight loss and thermometric methods have been used to study the corrosion inhibition of mild steel in acidic solution (HCl and H₂SO₄) by Schiff’s bases viz.N-(4-N,N-dimethylaminobenzal)-p-anisidine (SB₁), N-(4-N,N-dimethylaminobenzal)-p-toluidine (SB₂) and N-(4-N,N-dimethylaminobenzal)-2,4-dinitroaniline(SB₃). The efficiencies have been compared with those of parent amines from which Schiff’s bases have been derived. [2-4]

The corrosion inhibition of mild steel in acidic solution H₂SO₄ {0.5N (24hr)} by Schiff’s bases viz.-N-(vanillin)-p-toludine (SB₁), N-(vanillin) –p-anisidine (SB₂) and N-(anisaldehyde)-α-napthyl amine (SB₃) has been studied by mass loss method. Coefficient of correlation is used to find the best Schiff’s base with respect to efficiency. [5]

The inhibition efficacy of alcoholic leaf extract of Jatropha curcas on Brass (Cu-Zn) in 1N Hydrochloric Acid and natural sea water environment are carried out using mass loss measurements. Experiments are performed by varying immersion period, concentration of the inhibitor and temperature. Experimental data fitted with the Langmuir and Frumkin adsorption isotherms. Comparing the corrosion product on the surface of Brass in the presence of inhibitor at both environments is studied by UV and IR spectra. [6]
Corrosion inhibition effect of 2- [4-(methylthio) phenyl] acetohydrazide (HYD) and 5-[4-(methylthio)benzyl]-4H-1,2,4-triazole-3-thiol (TRD) on zinc in 0.1 M HCl was studied by using mass loss, polarization and electrochemical impedance spectroscopy (EIS). Effect of concentration and temperature was evaluated by mass loss method. Results indicated that the compounds are efficient, mixed type but predominantly anodic in nature. [7]

In the present work the corrosion inhibition of mild steel in hydrochloric solution by Black pepper extract (Piper nigrum f. Piperaceae) was studied. The techniques employed for study were mass loss measurements, potentiodynamic polarization, linear polarization resistance and electrochemical impedance spectroscopy (EIS). The results obtained revealed that Black pepper extract was a good corrosion inhibitor for mild steel in hydrochloric acid medium and maximum inhibition efficiency (98%) was found at 120 ppm at 35 ºC. [8]

The inhibitive action of the ethanolic extract of different plant parts of the Artocarpus heterophyllus and Acacia Senegal plant towards hydrochloric acid and sulfuric acid corrosion of aluminum is tested using mass loss and thermometric techniques. [9]

The performance of triethylenetetramine-tribenzylidene (TTTB) and triethylenetetramine-trisalicylidene (TTTS) as corrosion inhibitors for zinc in hydrochloric acid is investigated. At lower concentrations, both inhibitors accelerate the attack but inhibit corrosion at higher concentrations, e.g., 96–100% with 1.0% concentration in 0.5 M and 1.0 M HCl. [9]

The corrosion inhibition of aluminium in HCl solution in the presence of exudates gum from Raphia hookeri at temperature range of 30–608C was studied using weight loss and thermometric techniques. The exudates gum acts as an inhibitor in the acid environment. The inhibition efficiency increases with increase in inhibitor concentration but decreases with an increase in temperature. [10]

The efficiency of N-(2-hydroxyphenyl)salicyaldimine (1), N,N-bis-(salicyaldehyde)-1,3-diaminopropane (2) and N,N-bis-(2-hydroxybenzyl)-1,3-diaminopropane (3), derived from the reduction of N,N-bis-(salicyaldehyde)-1,3-diaminopropane (2), as corrosion inhibitors has been
studied. Weight loss, polarization and electrochemical impedance spectroscopy experiments have shown the reduced compound 3 to be the best amongst the compounds studied. [11]

Weight loss and thermometric methods have been used to study the corrosion inhibition of aluminium in trichloroacetic acid (TCA) solution, methoxyaniline (SB1), N-(4-N,N-dimethylamino) benzylidene-2-methylaniline (SB2) and (4N,N-dimethylamino) benzylidene-3-methylaniline (SB3). Results of inhibition efficiencies obtained from two methods are in good agreement with each other. [12]

The corrosion inhibition of mild steel with Schiff base compounds derived from salicylaldehyde and the corresponding amine was studied in relation to the concentration using electrochemical techniques. The maximum inhibition efficiency (\( \eta \)) was obtained for the N-(2-methyl phenyl) salicyaldimine compound with the three-electrochemical techniques applied. The N-(2-methylphenyl) salicyaldimine and N-(2-methoxyphenyl) salicyaldimine compounds were seen to obey the Temkin adsorption isotherm whereas N-(2-hydroxyphenyl) salicyaldimine obeyed the Langmuir adsorption isotherm. [13]

The inhibiting action of some Schiff bases on the corrosion of copper in hydrochloric has been studied. The Schiff bases N, N′-p-phenylen-bis (3-methoxy-salicylidename) (V-pph-V), N, N′-o-phenylen-bis (3-methoxy-salicylidename) (V-oph-V), and N′-histidine-3-methoxy-salicylidename (V-his) were synthesized by reacting 3-methoxy-salicylaldehyde with aromatic amines and histidine. The inhibiting action of these Schiff bases has been studied on the corrosion of copper in 5% HCl solution. [14]

The inhibiting action of some Schiff bases on the corrosion of copper and its alloys in hydrochloric and sulphuric acid solutions has been studied. The Schiff bases were synthesized by reacting salicylaldehyde with aliphatic or aromatic amines. The behaviors of electrolytic copper, Al brass and cupronickels (90wt.%Cu-10wt.%Ni and 70wt.%Cu-30wt.%Ni with 0.4 wt.% Fe) have been examined. [15]

The inhibition effect of the Schiff bases N,N′-bis(salicylidene)-1,2-ethylene diamine (Salen), N,N′-bis(5-methoxysalicylidene)-1,2-ethylene diamine (MeO-Salen) and N,N′-bis(5-nitrosalicylidene)-1,2-ethylene diamine (NO\(_2\)-Salen) on the corrosion of the mild steel in 1.0 M
HCl has been studied by electrochemical impedance spectroscopy (EIS), linear polarization resistance (LPR) and Tafel polarization measurements. [16]

In the present work, the effect of some newly synthesized Schiff bases containing sulphur nitrogen as heteroatom was investigated on mild steel corrosion in acidic media. Electrochemical studies of the mild steel samples were performed in an aerated solution of 0.1 M HCl + dimethyl sulphoxide (DMS) as co-solvent. DMS is also behaving as a corrosion inhibitor for mild steel. [17]

The work described here deals with the performance of ethylenediamine N,N′-dibenzylidene, ethylenediamine N,N′-di(p-methoxybenzylidene), ethylenediamine N,N′-disalicylidene as corrosion inhibitors for zinc in sulphuric acid. The effect of various parameters on the efficiency of these inhibitors has been studied. Ethylenediamine N, N′-di (p-methoxybenzylidene) and ethylenediamine N, N′-disalicylidene gives 99% protection under a variety of conditions. [18]

The analytical applicability of heteroaromatic Schiff bases, 2-(3-pyridylmethyliminomethyl)phenol (A), 2-(2-pyridyliminomethyl)phenol (B), 2-(2-amino-3-pyridyliminomethyl)phenol (C), N,N′-bis(salicylidene)-2,3-pyridinediamine (D), N,N′-bis(salicylidene)-2,6-pyridinediamine (E) and 2-(2-amino-4-methoxy-6-methyl-3-pyridylmethyliminomethyl)phenol (F), was proved. The investigation included a study of the characteristics that are essential for solvent extraction and for the spectrophotometric and spectrofluorimetric determinations of copper. [19]

The inhibition effect of potassium iodate on the corrosion of aluminum in 2M HCl has been studied by weight loss, polarization and electrochemical impedance spectroscopy (EIS) measurements. It has been found that KIO3 acts as an excellent inhibitor. Inhibition efficiency with 100 ppm inhibitor was very high. [21]

The corrosion behavior of aluminum in 0.5 M HCl solution in the absence and presence of (E)-3,6-dibromo-2-((4-methoxyphenylimino)methyl)phenol(I), (E)-3,6-dibromo-2-{(4-chlorophenylimino) methyl} phenol (II) and (E)-4-(3,6-dibromo-2-hydroxybenzylideneamino)benzoic acid(III) was investigated using potentiodynamic polarization,
electrochemical impedance spectroscopy (EIS) and electrochemical frequency modulation (EFM) techniques. [20]

A new class of corrosion inhibitors namely dianiline Schiff bases was synthesized and its inhibiting action on the corrosion of mild steel in 1M sulphuric acid at 30°C was investigated by various corrosion monitoring techniques. The effect of temperature on the corrosion behaviour of mild steel in 1M sulphuric acid with the addition of the Schiff bases was studied in the temperature range from 40°C- 60°C. [21-23]

The inhibition effect of Schiff bases benzylidene-(2-methoxy-phenyl)-amine (A), (2-methoxy-phenyl)-(4-methyl-benzylidene)-amine (B), (4-chloro-benzylidene)-(2-methoxy-phenyl)-amine (C) and (4-nitro-bezylidene)-(2-methoxy-phenyl)-amine(D) on the corrosion of aluminum in 1 M HCl has been studied by polarization, electrochemical impedance spectroscopy (EIS)and weight loss measurements. [24]

Three optically active Schiff-base ligands have been prepared by condensation of 2-hydroxyacetophenone with (1R,2R)-(-)-1,2-diaminocyclohexane, (1S,2S)-(-)-1,2-diphenylethylendiamine or R-(+)-2,2’-diamino-1,1’-binaphthalene, respectively. The products have been characterized by their IR, 1H- and 13C-NMR spectra. [25]

The inhibition effects of 8-hydroxy quinoline (HQ) and 3-formyl 8-hydroxy quinoline (FQ) on corrosion of mild steel in hydrochloric acid was investigated. It was studied through weight loss, polarization and electrochemical impedance spectroscopic techniques. [26]

The inhibition efficiency of acetone extract of red onion skin on aluminium in hydrochloric acid solutions has been evaluated by weight loss techniques. Values of inhibition efficiency obtained are dependent upon the concentration of inhibitor and temperature. [27]

A microwave-assisted preparation of a series of Schiff-base via efficient condensation of Salicylaldehyde and aryl amine without solvent is described in high yield as well as environmental friendship reaction in organic synthesis.

Applications of Schiff’s bases and their metal complexes as catalysts, in various biological systems, polymers and dyes are described. [28-29]
The study of the effectiveness of several potential copper corrosion inhibitors in acidic media was studied. Thiazole derivatives, 5-benzylidene-2,4-dioxotetrahydro-1,3-thiazole (BDT), 5-(4′-isopropylbenzylidene)-2,4-dioxotetrahydro-1,3-thiazole (IPBDT), 5-(3′-thenylidene)-2,4-dioxotetrahydro-1,3-thiazole (TDT), and 5-(3′,4′-dimethoxybenzylidene)-2,4-dioxotetrahydro-1,3-thiazole (MBDT) were tested for copper corrosion inhibition properties. [30]

The corrosion inhibitive effects of Aningeriarobusta extract for aluminium in 2 M HCl solution and the influence of potassium iodide additives on the inhibition efficiency was assessed using hydrogen evolution method at 30 and 60°C. [31]

Sulphuric acid and sulphanilamide Schiff’s bases have been synthesized and evaluated as inhibitors for mild steel corrosion in 1M H_2SO_4 by electrochemical and non electrochemical techniques. The inhibition efficiency (IE) increases with inhibitor concentration and decreases with temperature. [32]

In this study the effect of a new synthetic Schiff base namely bis-(2-hydroxy-3-methoxy)-1,6-diaminohexane salicylaldimine on the corrosion and dezincification of a 70/30 brass in 1M HCl has been studied using weight loss. [33]

The corrosion behavior and mechanism of ANB with different concentrations in hydrochloric acid was studied by chemical method (weight loss) and electrochemical technique (galvanostatic polarization). The inhibition efficiency of ANB increased as the concentration of ANB increased. At the optimum concentration of 0.001% of ANB, it gives inhibition of 56.4% and 0.5% concentration gives 99.0% inhibition and maximum inhibition, i.e.; 99.9% is achieved at 1.0% concentration. [34]

The perpetual quest for more efficient and environment friendly corrosion inhibitors remain a focal point in corrosion control. The use of organic compounds to inhibit corrosion has assumed great significance due to their vast applications in counteracting wastage of ferrous alloys. These compounds have shown great effectiveness for inhibiting aqueous corrosion due to film formation by adsorption on the metal surface. This paper reviews the inhibitive effect of pyrimidine derivatives as corrosion inhibitor. [35]
Schiff bases derived from condensation reaction of Acrolein with 2-aminophenol (SB$_1$), Cinnamaldehyde with 2-aminophenol (SB$_2$) and Cinnamaldehyde with phenylenediamine (SB$_3$) were prepared. These Schiff bases identified by UV-Vis, IR, CHN and H1NMR. The study also included the use of these Schiff bases as inhibitors for corrosion of carbon steel in acidic media 0.5 N HCl. The rate corrosion was measured by Electrochemical and Weight loss methods and it was found that their results are in agreement between them. The results indicated that these Schiff bases inhibited the corrosion efficiently. [36]

The weight loss technique has been used to study the corrosion inhibition of mild steel in 0.1N HNO$_3$ acidic medium by the Schiff base 4-Chloro-2-(2-oxo-1,2-dihydro indol-3-ylidene amino)-benzoic acid (ACBAI) and their Titanium (IV), Zirconium (IV), Cadmium (II) and Mercury (II) metal complexes. Thus, inhibition efficiency was obtained of Schiff base and its metal complexes. The phenomenon of chemical adsorption form thin film on the surface of the material that stops access of the corrosive substance to the metal which increases in its inhibition efficiency. [37]