Corrosion Protection of Transport Vehicles by Nanocoating of Decahydrobenzo[8]annulene-5,10-dihyrazone in Corrosive Environments and Weather Change

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mode of failure of coated steel surfaces. e detailed mechanisms are unknown, but in an air saturated electrolyte disbanding is usually caused by the oxygen reaction and it is the high pH generated by this reaction that is considered to be most important [14].

e aim of this investigation has been to study the cathodic reaction on coated steel surfaces and to see if there is any connection between the rate of this reaction and the ability of a coating to protect against corrosion.

Although the combined application of plastic coating [15] and cathodic protection has become a widespread and general technology for preventing corrosion on buried steel pipelines, corrosion failures are still occasionally experienced, among others under disbanded coatings. e signi cance of coating disbonding has increasingly been realized since the rst recognition of disbonding s as a possible origin

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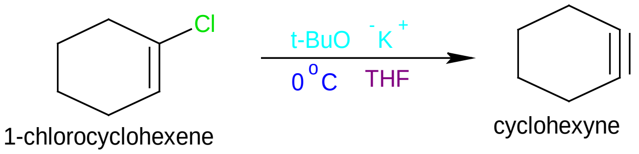
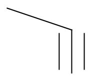


Figure 4: Cyclohexyne.



of decahydrobenzo[8]annulene-5,10-dihydrazone 85% was obtained (Figures 10-13).

Results and Discussion

e corrosion rates of epoxy-coated stainless steel, Nanocoated of decahydrobenzo[8]annulene-5,10-diylidenedihydrazine and SiC ller were calculated by equation K=13.56 X(W/ADt) and their results were written in Table 1. It was observed in absence of coating the corrosion rate of epoxy-coated stainless steel increased but these values were reduced in presence of nanocaoting and ller compounds. e results of Table 1 indicate that without coating corrosion rate of epoxy-coated stainless enhance at lower temperature to higher temperature but these values minimize with nanocoating and ller compounds. Figure 1 plotted between corrosion rate K(mmpy) vs. t(hrs) indicated that corrosion rate increased with exposer times duration were long but nanocoating and ller compounds reduced corrosion rate as shown in Figure 14. e corrosion rate of material is function of time, if materials expose in atmosphere in a longer duration without any protective substance, their corrosion rate accelerate. It is very di cult to control corrosion of epoxy-coated stainless steel corrosion but this technique give good results in above corrosive medium and weather change (Table 1 and Figure 14).

Corrosion rates of epoxy coated stainless steel, nanocoated decahydrobenzo[8]annulene-5,10-dihydrazone and SiC ller were calculated at di erent temperatures and their values are mentioned in Table 1. Figure 15 plotted between log K vs 1/T which indicated a straight line that the corrosion rate of epoxy-coated stainless steel reduced with nanocoating and ller material from lower to higher temperatures but its values enhance without coating. Decahydrobenzo[8]annulene-5,10-dihydrazone is an electron rich compound which adhere on the surface of epoxy-coated stainless and SiC ller blocks porosities of nanocoating material. Figure 15 shows that nanocoating and ller compounds reduced corrosion rate from lower to higher temperatures (Figure 15).

e values of log (/1-) for decahydrobenzo[8]annulene-5,10-dihydrazone and SiC ller at 273 to 298K were mentioned in Table 1.

e results of Table 1 noticed that nanocoating and ller compounds enhanced the values of log(/1-) at lower to higher temperature. Figure 16 drew between log (/1-) vs. 1/T found to be straight line which indicated that both compounds were increased its values as temperatures rising. e values log (/1-) of both compounds were shown that they mitigated corrosion rate and enhanced stability of surface barrier (Figure 16).

e surface coverage area ( ) was covered by decahydrobenzo[8] annulene-5,10-dihydrazone and SiC ller at di erent temperatures

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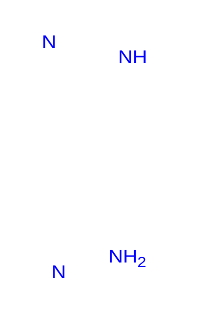

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porosities of nanocoating compound and produced non-permeable thin lm layer on the surface of base material. is barrier layer can stop osmosis or di usion process of corrosion pollutants (Figure 18).

Nanocoating compound decahydrobenzo[8]annulene-5,10-dihydrazone and SiC ller surface thin lm formation, bond formation, adsorption properties, types of reaction, stability and permeability barrier were studied by activation energy, heat of adsorption, free energy, enthalpy and entropy. Activation energy of decahydrobenzo[8] annulene-5,10-dihydrazone and SiC ller were calculated by Arrhenius equation $d/dT(\ln K)=Ae^{Ea/RT}$ and Figure 2 plotted between logK vs. 1/T and their values are mentioned in Table 2. e results of Table 2 show that without coating activation energy values were high but a er coating its values decreased as temperature enhanced. ese results indicate that nanocoating and ller compounds formed chemical bonding with base material. Heat of adsorption for nanocoationg and ller compounds were determined by equation log(«/1- «)=log(AC) (q/2.303RT) and Figure 3 and their values were expressed in Table 2 Heat of adsorption values found to be negative in both compounds. It con rmed that nanocoating and ller compounds attached with epoxy-coated stainless steel by chemical bonding. e negative sign of free energy indicated that nanocoating of decahydrobenzo[8]annulene-5,10-dihydrazone and SiC ller developed chemical bonding during

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