THE ROLE OF HYDRAZINE IN CONTROLLING CORROSION OF CARBON STEEL IN NATURAL WATER

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By

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ABSTRAK

Kerja ini mengkaji dan membincangkan mengenai kakisan logam keluli karbon dalam air semulajadi dan halangan terhadapnya dengan menggunakan hidrazin, suatu 'penghalang anod'. Experimentasi yang dijalankan terdiri daripada spesimen-spesimen uji keluli karbon yang direndamkan sepenuhnya dalam pelbagai sampel air semulajadi dengan penambahan hidrazin dan sebaliknya pada keadaan atmosfera. Kadar kakisan keluli karbon berkurangan secara beransur-ansur dengan peningkatan kepekatan hidrazin. Antara sampel-sampel air semulajadi yang digunakan, air tasik didapati merupakan persekitaran yang paling tinggi kakisannya terhadap logam berkenaan. Kadar kakisan dalam air laut lebih tinggi daripada dalam air hujan. Hidrazin bertindak untuk memperlahankan tindak balas anod iaitu mencegah pengoksidaan logam besi atau keluli kepada ion-ion Fe^{2+} dan Fe^{3+}, dan seterusnya mengawal proses kakisan daripada berlaku. Penambahan 8% hidrazin agak berkesan dalam semua sampel air semulajadi, dimana keberkesanannya menghampiri 100%. Hidrazin digunakan dengan paling berkesan dalam sampel air hujan bagi tujuannya. Kecekapan (P) penggunaan hidrazin adalah hampir sama dalam sampel air laut dan air tasik.

$$P_{\text{air hujan}} > P_{\text{air laut}} \approx P_{\text{air tasik}}$$

Kakisan keluli karbon kebanyakannya merupakan serangan jenis 'pitting' dan berlaku juga bentuk kakisan 'intergranular', 'uniform', dan 'selective'. Spesimen-spesimen uji keluli karbon mempunyai struktur kakisan yang lebih licin (fine) selepas 'mounted' dalam resin araldite.

ABSTRACT

The work deals with the corrosion of carbon steel in natural water and its inhibition by hydrazine, an anodic inhibitor. The experimentation consisted of carbon steel test specimens immersed in various natural water samples with and without hydrazine addition at atmospheric conditions. The corrosion rates of carbon steel decreased gradually with the increasing concentrations of hydrazine. Among the natural water samples, lake water was found to be the most corrosive environment for the metal. The corrosion rate in seawater is higher than in rainwater. Hydrazine acts in the manner of which, retard the anodic reactions and prevent the oxidation of iron (steel) to Fe^{2+} and Fe^{3+} ions, and hence, control the corrosion process. The addition of 8% hydrazine is considerably effective in all the natural water samples. Its efficiencies are nearly 100%. Hydrazine used most efficiently in rainwater for its purpose. The inhibitor efficiencies (P) in seawater and lake water are almost the same.

$$P_{\text{rainwater}} > P_{\text{seawater}} \approx P_{\text{lake water}}$$

The corrosion of carbon steel resulted in mostly pitting-type attack, and intergranular, uniform, and selective forms are also occurring. The specimens of carbon steel are having more fine corrosion structures after being mounted in araldite resin.