Announcements

Unit 4 - Week 2

Course outline

Week 0

Week 1

Week 2

How to access the portal?

Explanation of Corrosion

Mixed Potential Theory:

Explanation of Corrosion

Processes on the basis of

Explanation of Corrosion

Processes on the basis of

Explanation of Corrosion

Explanation of Corrosion

Quiz : Assignment 2

Assignment 2 - Solution

Feedback for Week-2

Processes on the basis of

Mixed Potential Theory: Part 3

Processes on the basis of

Mixed Potential Theory: Part 1

Mixed Potential Theory: Part 2

Mixed Potential Theory: Part 2

Introduction

(Cont...)

Week 3

Week 4

Week 5

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Week 7

Week 8

Live Session

Processes on the basis of

NPTEL » Corrosion - Part II

Assignment 2 The due date for submitting this assignment has passed. As per our records you have not submitted this assignment. Iron will passivate No, the answer is incorrect.

Accepted Answers:

all of the above

galvanically coupled to (A) a gold piece of 5 cm2 area and (B) a gold piece of 50 cm2 area: Iron will corrode more in case (A) Oron will corrode more in case (B)

1) Identify the correct statement for the corrosion behavior of iron (surface area: 5 cm²) in a deaerated 3.5% NaCl solution when it is 1 point

Ask a Question

Progress

Due on 2019-09-11, 23:59 IST.

Mentor

1 point

1 point

 No change in corrosion rates of iron in both the cases Score: 0

About the Course

Iron will corrode more in case (B) 2) Consider that a 0.8 wt% carbon steel obtained by furnace cooling is immersed in 3.5% NaCl solution. Which of the following 1 point statements is correct? ogalvanic couple will form between ferrite and cementite ocementite will act as cathode and ferrite will act as anode oferrite will corrode severely

No, the answer is incorrect. Accepted Answers: all of the above 3) Consider that two dissimilar metals (A and B) of equal area are galvanically coupled and immersed in an electrolyte having 1 point

solution resistance R. Which of the following statement is correct with respect to the junction point of A and B? OR is high and corrosion rate is more R is low and corrosion rate is more R is high and corrosion rate does not change

R is low and corrosion rate is less No, the answer is incorrect.

Accepted Answers:

R is low and corrosion rate is more

4) Consider that a piece of iron is immersed in a deaerated H₂SO₄ solution of pH 2 along with

FeCl₃ as impurity in the solution. The anodic and cathodic Tafel slopes are 0.15 V/decade of current density. The value of Ecorr (V) without FeCl3 addition with reference to standard

hydrogen electrode is:

(Given: icorr (without FeCl₃ addition) = 10⁻¹¹ A/cm²

icorr (with FeCl₃ addition) = 10⁻¹⁰ A/cm²

 $i_{o(Fe)}^{H_2} = 10^{-13} \text{ A/cm}^2$

 $i_{o(Fe)}^{Fe} = 10^{-13} \text{ A/cm}^2$

 $i_{o_{(Fe)}}^{Fe^{3+}/Fe^{2+}} = 10^{-12} \text{ A/cm}^2$

-(1.02 to 1.10)

 \bigcirc – (0.67 to 0.73)

 \bigcirc - (0.38 to 0.45)

-(0.12 to 0.20)No, the answer is incorrect. Score: 0

Accepted Answers: -(0.38 to 0.45)⁵⁾ Based on the data provided in Q4, the value of E_{eq}^{Fe} (V) is:

 \bigcirc – (0.95 to 1.11)

 \bigcirc – (0.09 to 0.15)

-(0.14 to 0.22) \bigcirc - (0.68 to 0.75)

No, the answer is incorrect.

Score: 0 Accepted Answers:

-(0.68 to 0.75)6) Based on the data provided in Q4, the value of Ecorr (V) with the addition of FeCl₃ with reference to standard hydrogen electrode 1 point is:

 \bigcirc – (1.74 to 1.82) \bigcirc (0.13 to 0.21)

 \bigcirc – (0.24 to 0.31) (1.74 to 1.82) No, the answer is incorrect. Score: 0

Accepted Answers: -(0.24 to 0.31)Based on the data provided in Q4, the value of $i_{c_{(Fe)}}^{Fe^{3+}/Fe^{2+}}$ (A/cm²) at E_{corr} (V) with the 1 point

addition of FeCl3 is: ○~10⁻¹⁴ ○~10⁻¹⁰ ○~10⁻⁸

○~10⁻⁶ No, the answer is incorrect. Score: 0 Accepted Answers: $\sim 10^{-10}$

Based on the data provided in Q4, the value of $E_{eq}^{Fe^{3+}/Fe^{2+}}$ (V) is: 1 point

-(0.72 to 0.80) \bigcirc (0.01 to 0.07) -(0.41 to 0.50)-(0.53 to 0.61)

No, the answer is incorrect. Score: 0 Accepted Answers:

9) Consider that a metal M is corroding in an aerated pure HCl solution. Which of the following plots illustrates the correct voltage 1 point

E(V) $i_{o_{(M)}}^{M}$ log i $i_{o_{(M)}}^{H_2}$ E(V) $i_{o_{(M)}}^{M}$

 $i_{o(M)}^{O_2}$

 $i_{o\,(M)}^{O_2}$

 $i_{o_{(M)}}^{M}$

 $i_{o_{(M)}}^{H_2}$

 $i_{o\,(M)}^{O_2}$

E(V)

 $E_{\text{couple}} \\$

 E_{couple}

 $i_{o_{(M)}}^{M \mid}$

E (V)

 E_{couple}

E (V)

○ E(V)

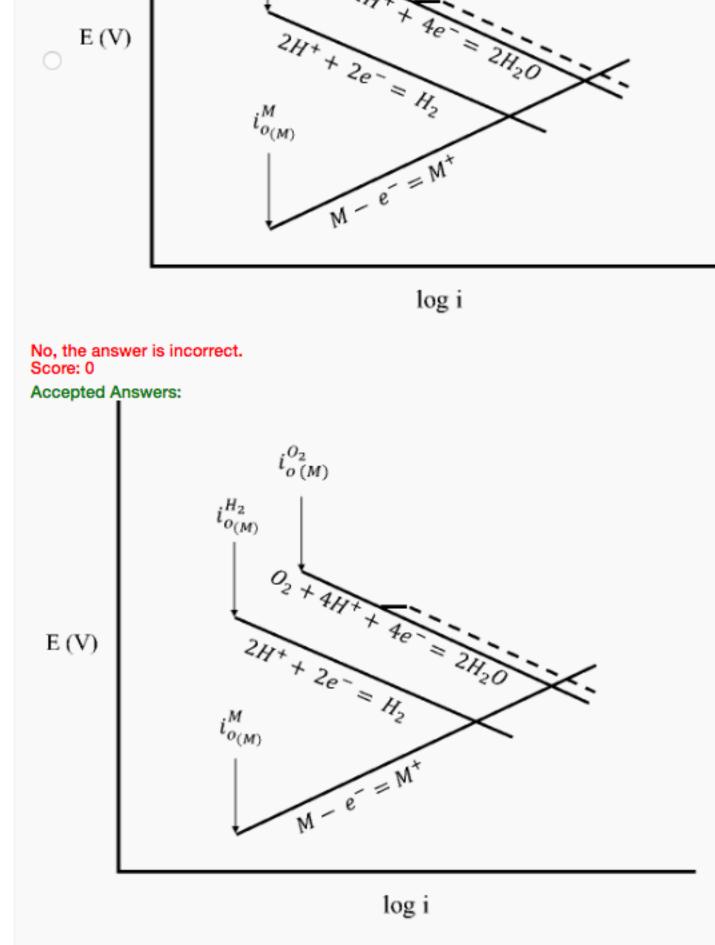
 $i_{o_{(M)}}^{H_2}$

log i

log i

(E) vs log current density (log i) for all the cathodic and anodic reactions:

(0.01 to 0.07)



 $\boldsymbol{E}_{\text{couple}}$ ○ E(V)

i_{corr (M-N)}

 $i_{corr\;(M\text{-}N)}$

icort (M-N)

log i

10) Consider two metals M and N of equal area galvanically coupled in a deaerated acidic solution. N is going to protect M

galvanically. Which of the following plots shows the correct resultant mixed potential for the couple?

log i

log i

1 point

