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| **Keywords:**  Iraqi Journal of Nanotechnology;  Iraqi Journal of Nanotechnology;  Iraqi Journal of Nanotechnology. | Abstract  The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.  The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible. The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible. |

Introduction

The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.   The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.   The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.   The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.   The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.

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Experimental procedure

The Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible, the Spectro-chemical analysis substrate material is reported in Table 1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Table 1. Spectro-chemical analysis of K417G Alloy | | | | | | | | |
| Ele. | Cr | Co | Mo | Si | Y | Ti | Al | Ni |
| Wt.% | 8.8 | 10.1 | 2.9 | - | - | 3.93 | 5.7 | Bal. |

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(W/A)2 = KPt (1)

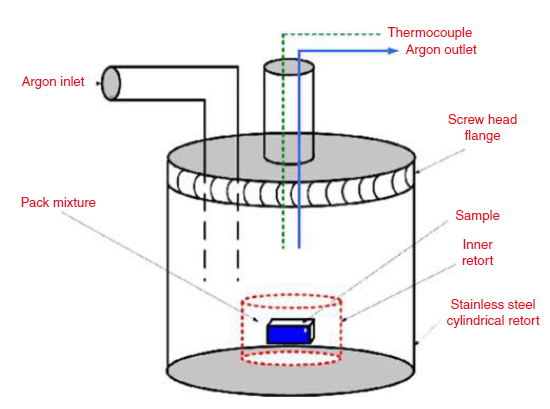


Figure 1. Pack Cementation Set-up

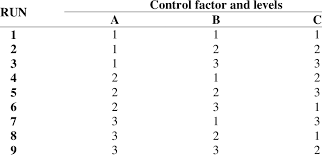


Table 2. Taguchi-Array L9

Results and discussion

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| --- | --- | --- | --- |
| Table 4. Parabolic rate constant (hot corrosion rate) kp (10-10 mg2 cm-4 s-1) | | | |
| Exp.No | KP1 | KP2 | KP3 |
| 1 | 1.33 | 1.10 | 1.01 |
| 2 | 1.24 | 1.21 | 1.91 |
| 3 | 1.43 | 0.91 | 0.79 |
| 4 | 1.35 | 1.13 | 0.80 |
| 5 | 1.11 | 1.05 | 0.75 |
| 6 | 1.02 | 1.14 | 0.97 |
| 7 | 1.27 | 1.07 | 0.73 |
| 8 | 1.92 | 0.81 | 0.88 |
| 9 | 1.30 | 0.85 | 0.76 |

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Some performance characteristics may need larger-the-better and some performance characteristics may need smaller-the-better. These two requirements use the following equations (2) and (3) respectively [13]:

Xi (k)= Xi(k)-min Xi(k) / max Xi(k) – min Xi(k) (2)

Xi (k)= max Xi(k)-Xi(k) / max Xi(k) – min Xi(k) (3)

Where, Xi(k) and Xi(k) are the sequences after the data processing and comparability sequence respectively, min Xi(k) is the smallest value of Xi(k) for the kth response and max Xi(k) is the largest value of Xi(k) for the kt response, k=1, 2, 3,… n.

Δoi (k)= |Xo\* (k) – Xi\* (k) (4)

Δ min is the minimum deviation

Δ max is the maximum deviation

In data processing, it is necessary to establish a relation between ideal and actual normalized experimental valves. It is done by calculating the grey relational coefficient which is obtained from the relation given below:

Ƹi (k) = Δmin + Ƹ Δmax / Δoi (k) + Ƹ Δmax (5)

Where:

Ƹ (k) = Grey relational coefficient

Ƹ is distinguishing coefficient fall

The parameters are given equal preference is taken as 0.5.

After obtaining the grey relational Coefficient; the grey relational grade is computed by averaging the grey relational coefficient corresponding to each performance characteristic. The overall evaluation of the multiple performance characteristics is based on the grey relational grade [14]:

ɣi = 1/n Σn Ƹi (k) (6)

where ɣi is the grey relational grade for the ith experiment and n is the number of performance characteristics.

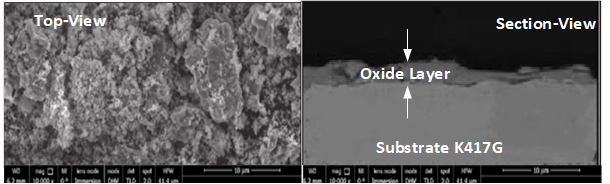
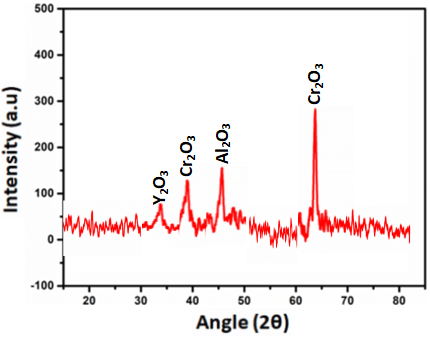
Based on the data sequence characteristics, data pre-processing have different methodologies pre started for the GRA [13].

Response or output can be converted into the comparative series according to Eq . (3) "smaller-the-better" characteristics.

Every one of the sequences of each performance characteristic after data processing utilizing Eq. (3) as shown in Table 5 normalization of performance characteristics.

Figure 2 shows the Iraqi journal of Nanotechnology **(IJN)** is an international, open access, peer-reviewed journal published by Al-sibd center for research and scholarly publishing. IJN is the first journal focusing on a top-notch topics like Nanotechnology in Iraq. The journal designed to represent and make the Iraqi universities research activities internationally visible and accessible.

Figure 2. SEM/XRD Analysis for hot corroded pack coated K417G at optimum setting conditions



Conclusion

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