PQI – 3303 – Fenômenos dos Transportes III – 2023 -Tarefa - Adsorção

Relatório em grupo, com o máximo de 5 alunos/grupo

Considere o experimento de adsorção de metanol em carvão ativo (resultados abaixo). Estime:

1. C/Co na saída do leito em função do tempo (fazer o gráfico),
2. u0 ,
3. Wsat e o coeficiente de distribuição,
4. t\* ,
5. tb/t\* para C/Co = 0,1 ,
6. u’ (velocidade da frente de avanço),
7. LUB/L.

Explique os cálculos e o significado dos resultados.

Dados do experimento:

Pressão: 709mmHg

Temperatura ambiente:21,5oC

Diâmetro interno da coluna: 2,25cm

Altura do leito de carvão: 31cm

Porosidade do leito: 0,63

Densidade aparente:0,481g/cm3

Densidade do carvão: 1,30g/cm3

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| **MEDIDA Nº** | **MASSA DA COLUNA + CARVÃO (g)** | **MASSA DO BORBULHADOR + METANOL (g)** | **ΔCOLUNA (C)(g)** | **ΔBORBULHADOR (B) (g)** | **ΔB-ΔC** | **VAZÃO DE AR (mL/s)** | **TEMPO (min)** |
| **0** | **245,60** | **221,42** |  |  |  | **18,24** | **0** |
| **1** | **248,07** | **219,01** | **2,47** | **2,41** | **-0,06** | **16,94** | **20** |
| **2** | **250,13** | **216,30** | **2,06** | **2,71** | **0,65** | **17,97** | **50** |
| **3** | **252,92** | **213,51** | **2,79** | **2,79** | **0,00** | **17,10** | **78** |
| **4** | **254,42** | **212,00** | **1,50** | **1,51** | **0,01** | **18,37** | **97** |
| **5** | **255,73** | **210,60** | **1,31** | **1,40** | **0,09** | **17,24** | **115** |
| **6** | **257,26** | **208,98** | **1,53** | **1,62** | **0,09** | **18,60** | **133** |
| **7** | **258,50** | **207,47** | **1,24** | **1,51** | **0,27** | **18,08** | **151** |
| **8** | **259,24** | **205,85** | **0,74** | **1,62** | **0,88** | **18,16** | **170** |
| **9** | **259,66** | **203,73** | **0,42** | **2,12** | **1,70** | **18,16** | **198** |
| **10** | **259,83** | **201,89** | **0,17** | **1,84** | **1,67** | **18,44** | **222** |
| **11** | **259,90** | **200,53** | **0,07** | **1,36** | **1,29** | **18,44** | **240** |
| **12** | **259,95** | **198,87** | **0,05** | **1,66** | **1,61** | **18,44** | **260** |
| **13** | **259,97** | **198,04** | **0,02** | **0,83** | **0,81** | **18,44** | **270** |
| **14** | **259,99** | **197,10** | **0,02** | **0,94** | **0,92** | **18,44** | **285** |
| **15** | **260,00** | **196,15** | **0,01** | **0,95** | **0,94** | **18,44** | **300** |

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| Tempo, min | metanol retido g/min | metanol alimentado g/min | metanol saída g/min | C/Co |
| ... |  |  |  |  |

Perfil de temperatura na coluna

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|  | 1min | 17min | 37min | 78min | 97min | 115min | 133min | 151min | 170min | 198min |
| L(cm) | T(oC) | T(oC) | T(oC) | T(oC) | T(oC) | T(oC) | T(oC) | T(oC) | T(oC) | T(oC) |
| 1 | 30 | 36 | 28 | 25 | 27 | 26 | 26 | 25 | 25 | 24 |
| 2 | 25 | 40 | 30 | 25 | 26 | 26 | 26 | 24 | 25 | 24 |
| 3 | 22 | 44 | 34 | 25 | 25 | 26 | 25 | 24 | 25 | 24 |
| 4 | 22 | 45 | 36 | 26 | 25 | 26 | 25 | 24 | 25 | 24 |
| 5 | 22 | 46 | 37 | 26 | 26 | 26 | 25 | 24 | 25 | 24 |
| 6 | 22 | 46 | 38 | 27 | 26 | 25 | 24 | 24 | 25 | 24 |
| 7 | 22 | 44 | 39 | 27 | 26 | 25 | 24 | 24 | 25 | 24 |
| 8 | 22 | 39 | 39 | 27 | 26 | 25 | 24 | 24 | 25 | 24 |
| 9 | 22 | 34 | 39 | 28 | 27 | 26 | 24 | 24 | 25 | 24 |
| 10 | 22 | 33 | 34 | 29 | 27 | 26 | 25 | 24 | 25 | 24 |
| 11 | 22 | 31 | 29 | 30 | 27 | 26 | 25 | 24 | 25 | 24 |
| 12 | 22 | 30 | 27 | 32 | 28 | 26 | 25 | 24 | 25 | 24 |
| 13 | 22 | 27 | 26 | 34 | 28 | 26 | 25 | 24 | 25 | 24 |
| 14 | 22 | 27 | 25 | 35 | 29 | 27 | 25 | 24 | 25 | 24 |
| 15 | 22 | 25 | 25 | 36 | 30 | 27 | 25 | 24 | 25 | 24 |
| 16 | 22 | 24 | 25 | 36 | 30 | 27 | 25 | 24 | 25 | 24 |
| 17 | 22 | 23 | 24 | 35 | 31 | 28 | 26 | 24 | 26 | 24 |
| 18 | 22 | 22 | 24 | 33 | 32 | 30 | 26 | 24 | 26 | 24 |
| 19 | 22 | 22 | 24 | 29 | 33 | 32 | 26 | 24 | 26 | 24 |
| 20 | 22 | 22 | 23 | 27 | 34 | 34 | 27 | 24 | 26 | 24 |
| 21 | 22 | 22 | 23 | 27 | 33 | 36 | 28 | 25 | 26 | 24 |
| 22 | 22 | 22 | 23 | 26 | 32 | 38 | 29 | 26 | 26 | 25 |
| 23 | 22 | 22 | 22 | 26 | 28 | 38 | 30 | 26 | 26 | 25 |
| 24 | 22 | 22 | 22 | 26 | 27 | 38 | 32 | 27 | 26 | 25 |
| 25 | 22 | 22 | 22 | 25 | 27 | 36 | 34 | 28 | 27 | 25 |
| 26 | 22 | 22 | 22 | 25 | 27 | 32 | 35 | 29 | 27 | 25 |
| 27 | 22 | 22 | 22 | 25 | 26 | 28 | 38 | 30 | 28 | 25 |
| 28 | 22 | 22 | 22 | 24 | 26 | 27 | 38 | 31 | 29 | 25 |
| 29 | 21 | 22 | 22 | 24 | 25 | 27 | 37 | 32 | 29 | 25 |
| 30 | 21 | 22 | 22 | 23 | 25 | 26 | 35 | 31 | 28 | 25 |
| 31 | 21 | 22 | 22 | 23 | 24 | 25 | 27 | 30 | 27 | 25 |
| 32 | 21 | 22 | 22 | 23 | 23 | 25 | 26 | 29 | 27 | 25 |

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