

Biofiltration Of Volatile Organic Compound (VOC) Mixtures Under Transient Conditions

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Summary

In this study, a transient biofilter model for binary volatile organic compound (VOC) mixture is developed. In the model, general mixing, oxygen limitation aspects, multicomponent adsorption phenomena, Monod- and Andrews-type kinetics with interference between the components are considered. Multicomponent adsorption isotherms are developed and used in the solution of the model. The model has been solved by two approaches, (approximate and general) and validated with biofiltration of benzene-toluene mixture data of previous work. The approximate model is based on the quasi-steady-state approximation in the biofilm, but the general model is solved as it is without any simplifications. The results show that the predictions by the general model are closer to the actual experimental results. It was also found that inlet oxygen composition plays an important role in the biofiltration of mixed VOC removal, specially at high inlet concentrations. (C) 1997 Elsevier Science Ltd.

References:

1. ANDREWS JF, 1968, BIOTECHNOL BIOENGG, V10, P707
2. ANSAR Z, 1996, THESIS KING FAHD U P
3. BALTZIS BC, 1994, P 87 A WMA M
4. DESHUSSES MA, 1995, ENVIRON SCI TECHNOL, V29, P1048
5. DESHUSSES MA, 1995, ENVIRON SCI TECHNOL, V29, P1059
6. DESHUSSES MA, 1996, BIOTECHNOL BIOENG, V49, P587
7. FAN LS, 1990, BIOTECHNOL BIOENG, V35, P279
8. HODGE DS, 1995, J ENVIRON ENG-ASCE, V121, P21

9. MONOD J, 1942, RECHERCHES CROISSANC
10. OH YS, 1994, BIOTECHNOL BIOENG, V44, P533
11. RUTHVEN DM, 1994, PRINCIPLES ADSORPTIO, V5
12. ZAROOK SM, 1993, BIOTECHNOL BIOENGG, V41, P512
13. ZAROOK SM, 1994, ADV BIOPROCESS ENG, P397
14. ZAROOK SM, 1994, CHEM ENG SCI, V49, P4347
15. ZAROOK SM, 1994, THESIS NEW JERSEY I
16. ZAROOK SM, 1997, CHEM ENG SCI, V52, P759
17. ZAROOK SM, 1997, IN PRESS BIOCH ENG J

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