Title: Effects of process variables and kinetics on the degradation of 2,4-dichlorophenol using Advanced Reduction Processes (ARP)

Authors: Xingyue Yu, Deirdre Cabooter, Raf Dewil

PII: S0304-3894(18)30405-9
DOI: https://doi.org/10.1016/j.jhazmat.2018.05.049
Reference: HAZMAT 19416

To appear in: *Journal of Hazardous Materials*

Received date: 19-12-2017
Revised date: 21-5-2018
Accepted date: 24-5-2018

Please cite this article as: Yu X, Cabooter D, Dewil R, Effects of process variables and kinetics on the degradation of 2,4-dichlorophenol using Advanced Reduction Processes (ARP), *Journal of Hazardous Materials* (2018), https://doi.org/10.1016/j.jhazmat.2018.05.049

Effects of process variables and kinetics on the degradation of 2,4-dichlorophenol using Advanced Reduction Processes (ARP)

Xingyue Yu [a,b], Deirdre Cabooter [a], Raf Dewil [b,*]

[a] KU Leuven, Department of Pharmaceutical and Pharmacological Sciences, Pharmaceutical Analysis, Herestraat 49, B-3000 Leuven, Belgium

[b] KU Leuven, Department of Chemical Engineering, Process and Environmental Technology Lab, J. De Nayerlaan 5, B-2860 Sint-Katelijne-Waver, Belgium

*** Corresponding author: raf.dewil@kuleuven.be**

Abstract

This study aims at investigating the efficiency and kinetics of 2,4-DCP degradation via advanced reduction processes (ARP). Using UV light as activation method, the highest degradation efficiency of 2,4-DCP was obtained when using sulphite as a reducing agent. The highest degradation efficiency was observed under alkaline conditions (pH=10.0), for high sulphite dosage and UV intensity, and low 2,4-DCP concentration. For all process conditions, first-order reaction rate kinetics were applicable. A quadratic polynomial equation fitted by a Box-Behnken Design was used as a statistical model and proved to be precise and reliable in describing the significance of the different process variables. The analysis of variance demonstrated