

TABLE OF CONTENTS

Table of contents

Abstract	I
Table of contents	III
List of figures	V
List of tables	VII
Abbreviations	VIII
Symbols	X
Chapter 1 Introduction	1
1.1 Surfactant degradation products	1
1.2 Nonylphenols in environmental compartments	2
1.3 Perfluorooctanoic acid in environmental compartments	4
1.4 NP and PFOA contamination in Yangtze River	6
1.5 Organic matter interactions with organic pollutants	7
1.6 Innovative material for water treatment — Carbon nanotubes	8
1.7 Objectives of the thesis	10
Chapter 2 Theoretical background	12
2.1 Sorption of organic compounds from aqueous solution	12
2.2 Desorption hysteresis	14
2.3 Sorption of pollutants on organic matter	15
2.4 Sorption models	16
2.4.1 Linear model	16
2.4.2 Nonlinear models	17
Chapter 3 Materials and methods	19
3.1 Chemicals and adsorbents	19
3.1.1 Chemicals	19

SORPTION OF A NONYLPHENOL ISOMER AND PERFLUOROOCCTANOIC ACID ON
GEOSORBENTS AND CARBON NANOTUBES

3.1.2 Adsorbents	20
3.2 Adsorption experiments.....	23
3.2.1 Batch technique	23
3.2.2 Dialysis technique	24
3.2.3 Solution factors	24
3.3 Analytical methods.....	25
Chapter 4 Results and discussion	30
4.1 Sorption of NP111 onto Yangtze River sediments and their model components.....	30
4.1.1 The adsorption of NP111 on Yangtze River sediments.....	30
4.1.2 Adsorption of NP111 on model geosorbents.....	34
4.2 Effect of structural composition of humic substances on the sorption of NP111	38
4.2.1 NMR characterization of humic substances	38
4.2.2 Adsorption of NP111 to humic substances.....	43
4.2.3 Influence of pH on NP111 adsorption to selected humic substances	46
4.2.4 The correlation between K_{OC} values and the composition of humic substances	47
4.3 Adsorption of PFOA on Yangtze River sediments and their components	52
4.4 Adsorption of PFOA and NP111 on multi-walled carbon nanotubes	57
4.4.1 Characterization of multi-walled carbon nanotubes.....	57
4.4.2 Sorption of PFOA on multi-walled carbon nanotubes.....	64
4.4.3 Adsorption of NP111 on multi-walled carbon nanotubes	75
Chapter 5 Conclusions	78
References	82
Acknowledgements.....	98
Appendix	100
Curriculum vitae	101