1	Role of goethite during air oxidation of PAH
2	contaminated soils
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- 32 Table S1: Amount of soils, solvent extractable organic matter (EOM) and mineral phases used in the
- 33 experiment

EOM/Mineral phase mixtures		Soil/Mineral phase mixtures		
Minerals	EOM	Minerals	Soils	
Silica sand: 2 g	Homécourt: 47.1 mg	/	Homécourt: 2.5 g	
Silica sand: 2 g	Neuves-Maisons: 48.7 mg	/	Neuves-Maisons: 5 g	
Goethite: 0.5 g	Homécourt: 47.1 mg	Goethite: 0.5 g	Homécourt: 2.5 g	
Goethite: 0.5 g	Neuves-Maisons: 48.7 mg	Goethite: 0.5 g	Neuves-Maisons: 5 g	

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37	Table S2: Li	st of the a	uantified c	ompounds	and their	abbreviations
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PAHs		O-PACs		
Compound names	Abbreviations	Compound names	Abbreviations	
Naphthalene	Na	9-Fluorenone	Flone	
Acenaphthylene	Ace	Anthracene-9,10-dione	Adione	
Acenaphthene	Асу	Benzo[<i>de</i>]anthracene-7-	BAone	
Fluorene	FI	one		
Phenanthrene	Phe	Benz[<i>a</i>]anthracene-7,12-	BAdione	
Anthracene	Ant	dione		
Fluoranthene	Fluo			
Pyrene	Ру			
Benzo[a]anthracene	B[<i>a</i>]A			
Chrysene	Chr			
Benzo[<i>b</i>]fluoranthene	B[<i>b</i>]F			
Benzo[k]fluoranthene	B[<i>k</i>]F			
Benzo[<i>a</i>]pyrene	B[<i>a</i>]P			
Indeno[1,2,3- <i>cd</i>]pyrene	IP			
Dibenz[<i>a.h</i>]anthracene	DBA			
Benzo[<i>ghi</i>]perylene	B[<i>ghi</i>]P			

40 Goethite characterization

42	The X-Ray diffractogram (XRD) showed the main characterization peaks of goethite
43	(Figure S1). The specific surface (BET method) and the point of zero charge (PZC) were
44	determined and found to be 38 m ² /g and 9.0, respectively. Transmission electron
45	microscopy (TEM) images showed typical acicular shapes (Figure S2). These single crystals
46	were 300 to 600 nm long. The main crystallographic faces of goethite particles were
47	determined by atomic force microscopy (AFM) and found as (001), (101) and (121) or (021)
48	(Prélot et al., 2003). Using this data and the maximum of site density per surface unit on
49	each plane/face, the overall site density estimation of the singly coordinated surface groups
50	lied at 3.59 sites /nm ² .
51	
52	
53	Prélot B., Villiéras F., Pelletier M., Gérard G., Gaboriaud F., Ehrhardt JJ., Perrone J., Fedoroff
54	M., Jeanjean J., Lefèvre G., Mazerolles L., Pastol JL., Rouchaud JC., Lindecker C., 2003.
55	Morphology and surface heterogeneities in synthetic goethites. Journal of Colloid and
56	Interface Science, 261 244-254.



60 Figure S1: X-Ray diffractogram (XRD) of goethite particles



63 Figure S2: Bright field transmission electron microscopy (TEM) images showing goethite







68 EOM associated with mineral phases after the 60 °C and the 100 °C air oxidation experiments





72 EOM associated with mineral phases after the 60 °C and the 100 °C air oxidation experiments



75 Figure S5: O-PAC contents in the initial Homécourt extractable organic matter (EOM) and in the EOM

76 associated with mineral phases after the 60 °C and the 100 °C air oxidation experiments



- 79 Figure S6: O-PAC contents in the initial Neuves-Maisons extractable organic matter (EOM) and in the
- 80 EOM associated with mineral phases after the 60 °C and the 100 °C air oxidation experiments





83 Figure S7: 16 PAH concentrations in the initial Homécourt soil and in the soil taken alone and

84 associated with goethite after the 60 °C and the 100 °C air oxidation experiments



87 Figure S8: 16 PAH concentrations in the initial Neuves-Maisons soil and in the soil taken alone and

- 88 associated with goethite after the 60 °C and the 100 °C air oxidation experiments



- 93 Figure S9: O-PAC concentrations in the initial Homécourt soil and in the soil taken alone and
- 94 associated with goethite after the 60 °C and the 100 °C air oxidation experiments



97 Figure S10: O-PAC concentrations in the initial Neuves-Maisons soil and in the soil taken alone and

98 associated with goethite after the 60 °C and the 100 °C air oxidation experiments

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