Supplementary material

The model B contains eight scattering paths, assuming the same contributions for the first (oxygen) and the third (metal) shell as in the modelA, but considering different contributions for the second shell which is modeled with five phosphorous located at three different whereas the contribution from the six oxygen atoms located at around 3.5 Å is neglected.

The two models are summarized in the following table S1.

Table S1. Models considered for the fitting of the $k^3\chi(k)$ function (TM=Co/Fe; Za-Zb represents the central absorber and the scattering atom; CN is the coordination number).

Model A			**Model B**		
Coordination shell	**Z_a-Z_b**	**CN**	**Coordination shell**	**Z_a-Z_b**	**CN**
1	TM-O	2	1	TM-O	2
1	TM-O	2	1	TM-O	2
1	TM-O	2	1	TM-O	2
2	P-O	1	2	P-O	1
2	P-O	4	2	P-O	2
2	TM-O	6	2	P-O	2
3	TM-TM	4	3	TM-TM	4
3	TM-TM	2	3	TM-TM	2

The fitted mean square displacement obtained for the Model A are summarized in the table S2.

Table S2. FeFF fit results, mean square displacements (σ^2 / 10^{-3}Å^2), for Model A for the four considered samples. CN is the coordination number; M-Z represent the central absorber (M, that is Co or Fe respectively in the Co K-edge and the Fe K-edge fits) and the scattering atom (Z, that is O, P/O or Co/Fe in the three shells considered). Statistical errors on displacements are in all cases smaller than $0.2 \cdot 10^{-3}$Å^2.

			Co K-edge				Fe K-edge	
Shell	M-Z	CN	LCP	LCP@Ar	LCfP	LCfP@Ar	LCfP	LCfP@Ar
1st	M-O	2	7.7	9.5	9.5	9.5	19.9	3.1
	M-O	2	0.1	0.1	0.1	0.1	0.1	0.1
	M-O	2	1.4	0.9	0.9	2.0	0.4	6.0
2nd	M-P	1	6.5	4.3	4.7	3.1	5.9	0.1
	M-P	4	34.4	5.6	6.9	3.3	7.4	2.7
	M-O	6	34.4	32.2	36.1	12.0	23.0	1.6
3rd	M-M’	4	11.4	10.6	10.8	12.2	10.1	21.0
	M-M’	2	7.9	6.7	8.3	10.3	10.8	16.6
R factor (%)			2.9	5.1	3.9	5.8	6.0	8.5

The fitted distances between scattering atoms obtained for the Model B are summarized in the table S3.

Table S3. FeFF fit results (distances between scattering atoms in Å) for Model B for the four considered samples. CN is the coordination number; M-Z represent the central absorber (M, that is Co or Fe respectively in the Co K-edge and the Fe K-edge fits) and the scattering atom (Z, that is O, P/O or Co/Fe in the three shells considered). Statistical errors on distances are in all cases smaller than 0.01 Å.

			Co K-edge				Fe K-edge	
Shell	M-Z	CN	LCP	LCP@Ar	LCfP	LCfP@Ar	LCfP	LCfP@Ar
1st	M-O	2	2.01	2.02	2.03	2.04	1.99	1.95
	M-O	2	2.02	2.84	2.02	2.05	2.11	1.97
	M-O	2	2.34	2.41	2.36	2.27	2.19	2.10
2nd	M-P	1	2.63	2.63	2.63	2.61	2.86	2.52
	M-P	2	3.12	3.14	3.11	3.20	2.92	3.10
	M-P	2	3.23	3.22	3.23	3.23	3.44	3.27
3rd	M-M’	4	3.94	3.94	3.95	3.98	3.75	3.62
	M-M’	2	4.80	4.79	4.80	4.85	4.57	4.55
R factor (%)			6.6	6.5	6.8	8.5	9.3	8.5

The fitted mean square displacement obtained for the Model B are summarized in the table S4.

Table S4. FeFF fit results, mean square displacements (σ^2 / 10^{-3}Å^2), for Model B for the four considered samples. CN is the coordination number; M-Z represent the central absorber (M, that is Co or Fe respectively in the Co K-edge and the Fe K-edge fits) and the scattering atom (Z, that is O, P/O or Co/Fe in the three shells considered). Statistical errors on displacements are in all cases smaller than $0.2 \cdot 10^{-3}$Å^2.

			Co K-edge				Fe K-edge	
Shell	M-Z	CN	LCP	LCP@Ar	LCfP	LCfP@Ar	LCfP	LCfP@Ar
1st	M-O	2	2.0	1.0	6.2	8.1	15.4	2.7
	M-O	2	4.8	7.2	1.0	1.0	51.6	1.0
	M-O	2	2.8	3.4	3.0	1.0	1.0	1.0
2nd	M-P	1	1.0	1.0	1.0	1.0	10.2	1.0
	M-P	4	4.8	4.2	5.5	1.0	1.0	1.0
	M-O	6	1.0	1.0	1.0	1.0	1.0	1.0
3rd	M-M’	4	12.9	12.5	12.2	10.4	9.3	9.6
	M-M’	2	9.1	9.1	9.2	10.4	7.2	10.2
R factor (%)			2.9	5.1	3.9	5.8	6.0	8.5