Appendix B: PIXE Analysis Results

The following tables show the results of the PIXE analysis as wt% as elements. The numbers in parentheses are the counting errors. If the value shown is 3 times the error, then this value represents the detection limit.

Composition of Iron Nails

Sample	**58**	**57**	**59**
Mg	<.025	<0.023	<0.029
Al	0.035 (0.009)	0.049 (0.010)	0.036 (0.0090)
Si	0.257 (0.007)	0.568 (0.010)	0.214 (0.009)
P	0.065 (0.006)	0.109 (0.008)	0.191 (0.009)
S	0.039 (0.004)	0.020 (0.004)	0.061 (0.007)
Cl	0.096 (0.0050)	0.032 (0.0040)	0.123 (0.007)
K	0.038 (0.004)	0.197 (0.007)	0.059 (0.006)
Ca	0.072 (0.005)	0.075 (0.006)	0.088 (0.007)
Ti	0.017 (0.0040	<0.010	0.050 (0.007)
Cr	0.099 (0.010)	0.064 (0.009)	0.092 (0.013)
Mn	0.237 (0.019)	0.179 (0.017)	0.109 (0.021)
Fe	98.348 (0.347)	98.070 (0.355)	98.470 (0.436)
Cu	0.449 (0.018)	0.297 (0.017)	<0.031
Zn	<0.024	<0.025	<0.029
Zr	<0.020	<0.029	<0.047

Composition of MMS slags (tan)

Sample	**54**	**51**	**63a**	**63b**	**42**
MgO	<0.150	<0.109	<0.169	<0.065	<0.192
Al_2O_3	3.476 (0.090)	0.748 (0.053)	<0.561 (0.088)	0.561 (0.033)	0.762 (0.194)
SiO_2	15.053 (0.100)	3.198 (0.057)	8.821 (0.094)	2.694 (0.030)	20.931 (0.210)
P_2O_5	<0.115	0.167 (0.31)	<0.121	0.256 (0.024)	<0.291
SO_3	<0.023	0.073 (0.016)	0.085 (0.019)	0.244)0.013)	<0.041
Cl_2O	<0.012	<0.012	<0.016	0.030 (0.005)	<0.018
K_2O	0.421 (0.014)	0.259 (0.014)	1.115 (0.027)	0.262 (0.008)	<0.035
CaO	0.444 (0.021)	1.096 (0.035)	0.495 (0.032)	1.273 (0.021)	0.159 (0.029)
TiO_2	2.764 (0.051)	0.085 (0.018)	0.671 (0.034)	0.104 (0.009)	0.079 0.022)
Cr_2O_3	<0.039 (0.013)	<0.042	0.103 (0.023)	0.092 (0.013)	<0.053
MnO	0.195 (0.029)	0.212 (0.036)	0.130 (0.033)	0.333 (0.025)	<0.084
Fe_2O_3	76.556 (0.480)	92.760 (0.651)	85.429 (0.626)	93.586 (0.363)	76.634 (0.889)
CuO	<0.041	<0.038	0.047 (0.015)	<0.016	<0.032
ZnO	0.073 (0.021)	0.672 (0.036)	0.217 (0.021)	0.256 (0.012)	0.118 (0.019)
ZrO_2	<0.100	<0.077	0.416 (0.0470	<0.023	<0.085

Composition of MMS slags (black)

Sample	**62**	**64 charcoal**	**55**	**44**	**43**
MgO	<0.051	<0.455	<0.113	<0.061	<0.039
Al_2O_3	0.677 (0.026)	8.410 (0.241)	1.081 (0.057)	0.587 (0.036)	0.078 (0.015)
SiO_2	2.947 (0.024)	30.134 (0.262)	3.452 (0.054)	3.296 (0.038)	0.276 (0.013)
P_2O_5	0.064 (0.016)	<0.335	0.547 (0.039)	0.254 (0.026)	0.080 (0.011)
SO_3	0.209 (0.008)	3.369 (0.099)	0.231 (0.022)	1.042)0.023)	0.055 (0.009)
Cl_2O	<0.006	1.333 (0.046)	<0.013	<0.014	<0.007
K_2O	0.327 (0.007)	2.063 (0.056)	1.155 (0.024)	0.073 (0.006)	0.075 (0.006)
CaO	1.169 (0.015)	3.351 (0.097)	2.110 (0.044)	0.634 (0.017)	0.114 (0.009)
TiO_2	0.137 (0.008)	0.980 (0.061)	0.165 (0.0180	0.392 (0.017)	<0.014
Cr_2O_3	0.104 (0.009)	<0.082	0.068 (0.019)	0.102 (0.0.13	0.072 (0.012
MnO	0.284 (0.017)	<0.109	0.375 (0.036)	0.258 (0.023)	0.311 (0.025)
Fe_2O_3	93.708 (0.277)	45.899 (0.699)	89.044 (0.561)	92.902 (0.426)	98.577 (0.458)
CuO	<0.017	<0.218	<0.083	<0.024	<0.021
ZnO	<0.015	0.379 (0.119)	0.835 (0.055)	<0.021	<0.019
ZrO_2	<0.031	<0.699	<0.118	<0.042	<0.031

Composition of MMS stones

Sample	**54**	**42**
MgO	<0.191	<0.144
Al_2O_3	1.736 (0.194)	2.976 (0.129)
SiO_2	72.845 (0.271)	52.942 (0.137)
P_2O_5	<0.332	<0.187
SO_3	0.210 (0.024)	0.100 (0.013)
Cl_2O	<0.018	<0.011
K_2O	0.186 (0.016)	0.342 (0.015)
CaO	0.205 (0.026)	0.236 (0.021)
TiO_2	0.096 (0.016)	0.731 (0.021)
Cr_2O_3	<0.031	0.060 (0.012)
MnO	0.195 (0.030)	0.088 (0.0160
Fe_2O_3	23.283 (0.342)	41.640 (0.267)
CuO	<0.043	<0.034
ZnO	<0.040	0.124 (0.019)
ZrO_2	<0.113	<0.065