Structural, electrical and photocatalytic properties of iron-containing soda-lime aluminosilicate glass and glass-ceramics

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Table 1 ^{57}Fe Mössbauer fitted parameters for room temperature analyses of as collected slag (not heat-treated), melted slag at 1400 °C; heat treated at 800 °C for 100 min; and samples with different Fe_2O_3 and basicity content and the modified salag melted at 1400 °C; heat treated at 800 °C for 100 min

Sample	Species	A (%)	δ (mm s^{-1})	Δ (mm s^{-1})	Γ (mm s^{-1})
F-18	Fe^{III} T_d	78.8	$0.32_{\pm 0.01}$	$0.77_{\pm 0.02}$	$0.50_{\pm 0.02}$
	Fe^{III} T_d	21.2	$0.26_{\pm 0.02}$	$1.65_{\pm 0.07}$	$0.45_{\pm 0.05}$
F-12	Fe^{III} T_d	60.0	$0.28_{\pm 0.01}$	$1.00_{\pm 0.03}$	$0.53_{\pm 0.04}$
	Fe^{III} T_d	40.0	$0.24_{\pm 0.01}$	$1.78_{\pm 0.05}$	$0.54_{\pm 0.06}$
F-6 (B-1.00)	Fe^{III} T_d	58.1	$0.21_{\pm 0.02}$	$0.93_{\pm 0.07}$	$0.50_{\pm 0.08}$
	Fe^{III} T_d	41.9	$0.23_{\pm 0.02}$	$1.67_{\pm 0.11}$	$0.53_{\pm 0.11}$
B-1.75	Fe^{III} T_d	50.0	$0.19_{\pm 0.02}$	$0.84_{\pm 0.05}$	$0.39_{\pm 0.07}$
	Fe^{III} T_d	50.0	$0.12_{\pm 0.03}$	$1.73_{\pm 0.09}$	$0.54_{\pm 0.12}$
B-1.50	Fe^{III} T_d	76.4	$0.14_{\pm 0.02}$	$0.92_{\pm 0.04}$	$0.56_{\pm 0.05}$
	Fe^{III} T_d	23.6	$0.12_{\pm 0.03}$	$1.88_{\pm 0.07}$	$0.37_{\pm 0.08}$
B-1.25	Fe^{III} T_d	58.9	$0.20_{\pm 0.01}$	$0.84_{\pm 0.03}$	$0.48_{\pm 0.05}$
	Fe^{III} T_d	41.1	$0.12_{\pm 0.02}$	$1.88_{\pm 0.04}$	$0.44_{\pm 0.06}$
B-0.75	Fe^{III} T_d	60.6	$0.25_{\pm 0.02}$	$0.98_{\pm 0.07}$	$0.51_{\pm 0.05}$
	Fe^{III} T_d	39.4	$0.26_{\pm 0.02}$	$1.61_{\pm 0.13}$	$0.51_{\pm 0.12}$
M-1.5	Fe^{III} T_d	53.8	$0.26_{\pm 0.02}$	$0.82_{\pm 0.06}$	$0.51_{\pm 0.08}$
	Fe^{III} T_d	46.2	$0.18_{\pm 0.02}$	$1.78_{\pm 0.07}$	$0.52_{\pm 0.10}$
Melted slag	Fe^{III} O_h	52.1	$0.36_{\pm 0.01}$	$0.60_{\pm 0.06}$	$0.43_{\pm 0.06}$
	Fe^{III} O_h	47.9	$0.35_{\pm 0.01}$	$1.08_{\pm 0.09}$	$0.51_{\pm 0.06}$
As collected slag	Fe^{II} O_h	70.2	$1.01_{\pm 0.01}$	$1.81_{\pm 0.02}$	$0.47_{\pm 0.03}$
	Fe^{III} O_h	29.8	$0.48_{\pm 0.06}$	$1.32_{\pm 0.09}$	$0.53_{\pm 0.09}$

T_d tetrahedral, O_h octahedral, A absorption area, δ isomer shift, Δ quadrupole splitting, Γ line width

Table 2 XRF compositional analysis of combustible waste slag (weight %) collected July 2018 and nominal composition of the model slag B-1.50

	SiO_2	Al_2O_3	Fe_2O_3	CaO	Na_2O	TiO_2	MgO	P_2O_5	K_2O	MnO	Others
As collected slag	23.90	20.80	18.33	24.61	4.69	2.14	3.12	1.45	0.21	0.36	0.39
B-1.5	27.6	20	6	41.4	5	-	-	-	-	-	-

Table 3 DCconductivity at RT for the samples of basicity 0.75 to 1.75 and the modified slag heat-treated at 800 °C for 100 min

Sample	σ_{DC}[a] / $(\Omega\ cm)^{-1}$
B-0.75	2.2×10^{-12}
B-1.00	3.2×10^{-11}
B-1.25	7.0×10^{-10}
B-1.50	2.2×10^{-8}
B-1.75	6.5×10^{-9}
M-1.50	5.6×10^{-9}

[a] DC conductivity obtained from equivalent circuit modeling.