for the oxidation-reduction reaction of iron and sulfur, in the proportion of total tin from 0.001 to 5.0%. The glasses of this patent have a solar transmittance T_e at most 65%, a light transmittance T_v (by illuminant A, 2° visual field) at least 60%, for a 4 mm thickness glass, as defined in JIS R3106 (1998).

[0035] It would be advantageous to provide a soda-lime-silica glass with high visible light transmittance. Further, it would be advantageous to provide methods for making low iron soda-lime-silica glasses that can be used regardless of the type of heating system or furnace used to melt the glass batch materials and to eliminate the limitations associated with the same.

SUMMARY

[0036] According to the present disclosure, there is provided a glass or a glass sheet having a soda-lime-silica glass composition with a high visible light transmittance (L_{tC}) of at least 89%; with a dominant wavelength (DW) from about 490 to 505 nanometers and purity (Pe) of no more than 1% for control thickness of 5.66 mm. The glass composition comprising from 0.02 to 0.06 wt. % of total iron oxide (Fe_2O_3); from 0.006 to 0.02 wt. % of FeO (ferrous), from about 0.30 to 0.55 of redox (FeO/Fe_2O_3); from about 0.3 to 10 ppm of Cr_2O_3; from about 50 to 500 ppm of TiO_2; from about 10 to 500 ppm of SnO_2; and a critical amount from about 0.10 to 0.25 wt. % of SO_3.

[0037] The main objective in the present disclosure is to offer a clear glass composition with high visible light transmittance.

[0038] Another objective of the present disclosure is to offer a low-cost clear glass. This can be achieved by using low iron raw materials, such as low iron dolomite, and a mixture of clear and low iron cullet to accomplish the proper balance of colorants concentrations such as Cr_2O_3, TiO_2 and Fe_2O_3. Another option to achieve the desired properties is by using a partial substitution of low iron raw materials by regular raw materials except for low iron dolomite, the colorant concentrations such as Cr_2O_3, TiO_2 and Fe_2O_3 can be achieve by the use of regular sand in which these oxides are present as impurities.

[0038a] In one aspect, the present disclosure provides a method of making the clear glass using a conventional float non-vacuum glass system, the method comprising:

providing a glass batch having ingredients to make the glass having the basic soda-lime-silica glass composition and colorants;

melting the glass to provide a pool of molten glass;

flowing the molten glass onto a molten tin bath;

moving the molten glass on the surface of the molten tin bath, while controllably cooling the glass and applying forces to the glass to provide a glass of a desired thickness; and

removing the glass from the molten tin bath, wherein

the method of making the glass is change from one of the glass batch portions to the other one of the glass batch portions by altering the weight percent of the colorants to alter the weight percent of iron within the range specified for the glass batch portion being changed.

[0038b] In another aspect, the present disclosure provides a method of forming clear glass comprising

mixing raw materials, wherein the raw materials comprise cullet, sand, soda ash, salt cake, limestone and dolomite, wherein the dolomite comprises:

SiO_2	0 to 5
Na_2O	0 to 1
CaO	25 to 40
MgO	15 to 30
Al_2O_3	0 to 1
SO_3	0 to 1
Fe_2O_3	0 to 0.1

melting the raw materials to form molten glass;

flowing the molten glass onto a molten tin bath; moving the molten glass on the surface of the molten tin bath while controllably cooling the molten glass and applying forces to the molten glass to form a glass of a desired thickness and a desired width; and

removing the glass from the molten bath.

[0038c] In another aspect, the present disclosure provides a glass composition comprising

	Weight Percentage
SiO_2	65 to 75
Na_2O	10 to 20
K_2O	0 to 5
CaO	5 to 15
MgO	2 to 10
Al_2O_3	0 to 5
SO_3	0 to 0.5
Cr_2O_3	0.3 to 10 ppm
Fe_2O_3	0.02 to 0.07
FeO	0.005 to 0.03
Redox (FeO/Fe_2O_3)	0.2 to 0.6

[0039] Further non-limiting examples or aspects are set forth and described in the following clauses.

[0040] Clause 1: A clear glass having a soda-lime-silica glass composition comprising: total iron oxide (Fe_2O_3) of 0.02 to 0.06 wt. %;, ferrous (FeO) from 0.006 to 0.02 wt. %; redox (FeO/Fe_2O_3) from about 0.30 to 0.55 wt. %; Cr_2O_3 from about 0.3 to 10 ppm; TiO_2 from about 50 to 500 ppm; SnO_2 from about 10 to 500 ppm; and SO_3 from about 0.10 to 0.25 wt. %.