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Atterbury

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[54] **TREATMENT OF MOLTEN FERROUS METALS**

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.** **C21c 7/02**

[58] **Field of Search** 75/53, 58, 59, 60

[56] **References Cited**

UNITED STATES PATENTS

3,537,842	11/1970	Holland	75/58
3,567,432	3/1971	Wardell	75/53 X
3,585,025	6/1971	Obst et al.	75/53 X

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[57] **ABSTRACT**

Molten ferrous metals may be desulpherized with an additive comprising lime, sodium carbonate, fluorspar and not more than 0.25 percent by weight metal chloride.

3 Claims, No Drawings

TREATMENT OF MOLTEN FERROUS METALS

This invention relates to the treatment of molten ferrous metals and particularly to the desulphurizing of molten steel. The term ferrous metals includes cast irons, steels and ferro alloys.

The problems involved in the provision of a really satisfactory method of desulphurizing molten steel have been described at length in British Pat. Specification No. 1170168 to which reference may be made for further details. It is explained in the said specification that whilst the use of lime (CaO) as an additive to the molten steel appeared to be of probable value and economic to use, it gave rise to the difficulty that there was excessive heat removal from the molten steel occasioned by its use and it failed to form a fluid slag as necessary for satisfactory desulphurizing.

U.S. Pat. No. 3,537,842 to Holland provides one solution to the difficulty, in the form of a desulphurizing additive comprising lime, iron oxide and an oxidizable metal. The latter two ingredients react exothermically and this counteracts the loss of heat from the steel which occurs when lime alone is used. It is disclosed in the said specification that the additive composition may contain, inter alia, in addition to the foregoing ingredients, a fluoride such as fluorspar to increase the fluidity of the slag.

Whilst the foregoing compositions are very satisfactory in practice they do present the disadvantage that, apparently due to the exothermic reaction, they do tend to generate noxious fumes.

It has now surprisingly been found that very satisfactory results may be obtained by the use of a particular class of additive composition characteristic of this invention and without incurring the disadvantage just referred to.

According to the present invention there is provided a method for desulphurizing molten ferrous metals which comprises adding to the molten metal an additive which is a non-exothermic composition comprising lime, sodium carbonate and fluorspar and which contains at most 0.25 percent by weight metal chloride. It will be noted that the composition is not exothermic. Hence while the composition may contain other ingredients if desired, these ingredients should not be such as to set up an exothermic reaction. The compositions are thus clearly distinguished from those described in British Pat. specification No. 1170168.

The total of chloride in the composition (calculated as metal chloride) must not exceed 0.25 percent by weight, or fuming during use of the composition becomes excessive. Chlorine tends to be present as chloride impurities in the sodium carbonate used.

Preferably the lime constitutes 40 to 80 percent by weight of the additive. The proportions of fluorspar and of sodium carbonate may vary widely but will generally not exceed in either case 50 percent by weight of the composition. Preferred compositions are those comprising the specified ingredients in the following relative proportions, by weight:

Lime (CaO)	45 –65 parts
Fluorspar	25 –35 parts
Sodium carbonate	10 –30 parts

A specific formulation of value according to the invention consists of:

Lime (CaO)	56 parts
Fluorspar	29 parts
Sodium carbonate (containing 1% sodium chloride)	15 parts

The total chloride content of this composition is thus 0.15 percent by weight.

In use it was found that this composition generated very little fume when it was added to molten steel, in a ladle, prior to teeming.

A further specific formulation is a composition consisting of:

Lime	50 parts
Fluorspar	30 parts
Sodium carbonate (sodium chloride content 1% by weight)	20 parts

The total chloride content of this composition was 0.20 percent by weight. The amount of fume generated when this composition was used was well within normal steelworks tolerances.

The composition may be in the form of a powder mixture of the ingredients, or granules of the mixture or may be in the form of tablets.

The invention includes the desulphurizing compositions as defined, and the method of desulphurizing molten steel by adding the said composition thereto.

What we claim is:

1. In the desulphurizing of molten ferrous metals which includes providing a molten ferrous metal containing sulphur as an impurity and treating said ferrous metal with an additive to form a fluid slag in an amount sufficient to remove sulphur in desulphurizing amounts from said ferrous metal into said fluid slag, the improvement wherein said additive comprises a non-exothermic and non-noxious fume generating composition consisting essentially of, by weight, 45 to 65 parts lime, 10 to 30 parts sodium carbonate, and 25 to 35 parts fluorspar, said additive containing at most 0.25 percent by weight metal chloride, said composition enhancing said sulphur removal into said fluid slag.

2. A method according to claim **1** wherein the additive is added to the molten metal when the molten metal is in a ladle, prior to teeming.

3. A method according to claim **1** wherein the molten metal is steel.

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