

# The programme of estimation slags propriety

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## Abstract

This article contains information concerning the analysis of the possibility of defining refinery qualities of slag based of the thermophysical and thermodynamical data. The issues presented deals not only with refining copper and melting stages, but also the idea of building an optimization program. In its assumption the program is supposed to check and search specific data very quickly on the particular types of slag.

**Keywords:** Slags, Computer programme, Optymalisation

## 1. Introduction

The work will especially concentrate upon the slag extraction processes, there is commonly used in the casting processes of melting copper alloys. According to W. Nernst principle of division in this type of configuration as in the metallurgical slag the process of refining the state of solution with the non-metallic inclusions beining extracted is quickly established. In casting processes fusions metals and melts to head slag rafinators counts:

- effacement from refined melt harmful admixtures and pollutions,
- protection mirror of liquid metal from influences of atmosphere,
- limitation of negative interactions with facing of stove.

Matching the specified tasks require regard of the chemical mechanisms of interactions slags with the whole environment. Important part we attribute to effect consequent from rules establish conditions of balance of fusion atmosphere of metal with slag coat [1,2]. Takes root, that in the earliest stadiums of refinement are changes in chemical constitution such sheath, that additionally deepen side factors as a result of influence of dirt surfaces of added materials and fire-proof erosion of facing stove.

It the literature we can find publications relate to individual proprieties of slag refinement sheaths [3,4] and the descriptions of drawing ahead chemists effects [5-7].

It proves that there is a big discrepancy in the opinions on the structure and the basic features of slag as well as the essence of their interaction with refined metal and the atmosphere of melting.

In casting technological processes the fusion temperature, does not make up freely controllable parameter [8]. Necessary is to use fluxing factors or incassative, to correct stickiness. About difficult to catch changes of superficial interfacial tension, mainly between liquid metal, drip slag and extracted non - metallic interpolations, we can conclude based at total energetic factors, concurrent the exchange the pulp, the got on the ground analyses, method of differentiation of thermal effects and mass [9,10].

## 2. Conception of building of programme

The study of computer programme including the satisfactory number of data, both thermodynamical how and experimental - gathered with literature and own investiganion, the simpler qualification of optimum proprieties of slags would make

possible. Settled by programme of areas the verification it is possible to the end to conduct in the support about proposed by A. W. Bydalek [10] method of the modelling processes of refinement from it utilization the derivatograph or directly in conditions industrial. User starting programme should have the possibility of choice kind of the information, he would like to get which [11]

### 3. Working computer programme

After actuation programme and introduced three-phase user Gibbsa arrangement becomes the recess the suitable kind of material. It is then equilateral triangle which tops answer the

concrete entering in composition of studied material substance. Every point in arrangement answers the not only different quantitative composition of substance, but it be characterizes different proprieties physics chemical also.

Arrangement was partite on 400 areas, which answers changes composition of material, what 5% on every component. Restricting area and division him what 5% makes possible the comparatively precise qualification of propriety studied material regard of his molar composition.

User it after recess any area, clicking on him, gets information about the most important proprieties him characterizing. Additionally following drawing represents the principle of procurance of information the regard of passed area (fig. 1).

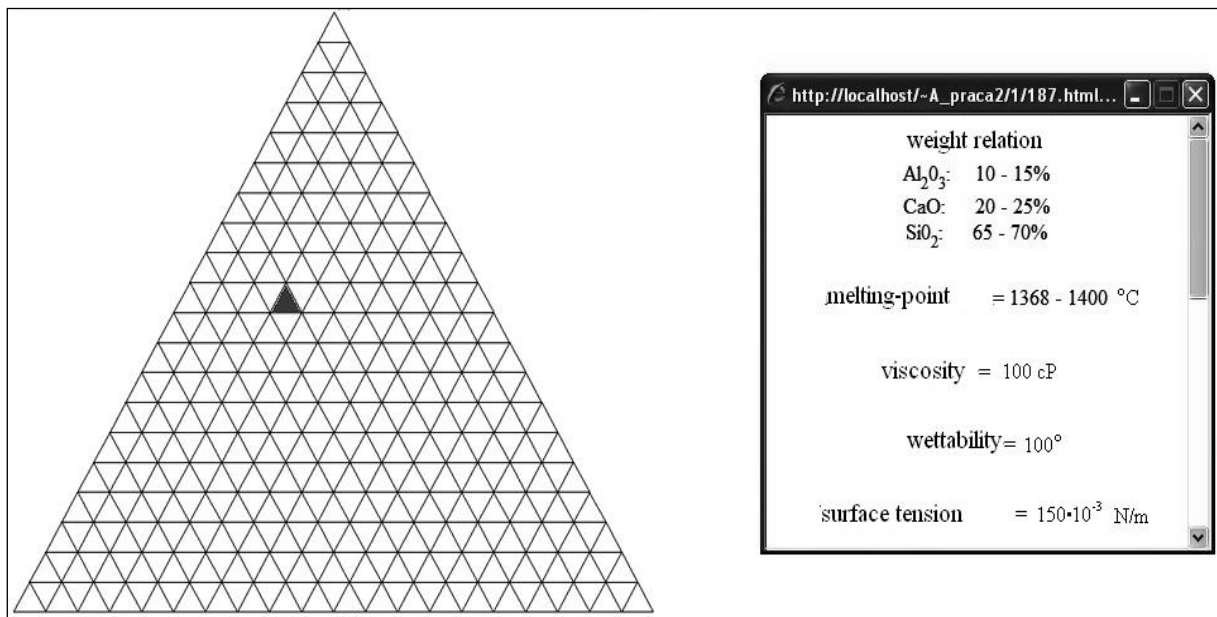


Fig. 1. Principle of procurance of information the regard of indicated area: user clique opens on passed area, then mouse representative window his propriety physics chemical

User has the possibility of filtration of database physics chemical also, thanks what it gets information about occurrence in arrangement of areas fulfilling passed by him criterions. After he recess kind it writes down he the limits the value of definite proprieties. The sended suitable form thereon becomes the basis from data to database. After correct realization question user gets in tabular figure information about possible occurrence about set proprieties areas. The result of question was it been possible additionally to broaden about information about remaining proprieties physics chemical. Besides, in aim the image of location about set properties the area on graph Gibbsa, the special navigator was created. After recess area and his click, displayed arrangement 3 becomes user - phase from noted on him at present under examination area. The principle of filtration of database

under regard of concrete properties on drawing 2 was introduced physics chemical (fig. 2)

It the patern of conduct in the work was presented the permissive on calculation for arrangement of oxides  $Al_2O_3$ - $SiO_2$ - $CaO$ - $B_2O_3$  optimal co-ordinates areas in reference to conditions of fusion silicon bronzes. Moved analysis was provided to carry to traditionally appointive in metallurgy of data in basing about measurements of stickiness and melting-point. It was showed on the figure 3 and they allow on the determining range favourable compositions - appointed with letters polygons. Optimization with proposed programme shew on appointed with triangle area (figure 3b). However the investigation DTA, from utilization the method of differentiation of thermal effects and mass, shew on appointed with wheel area ( the figure 3c).

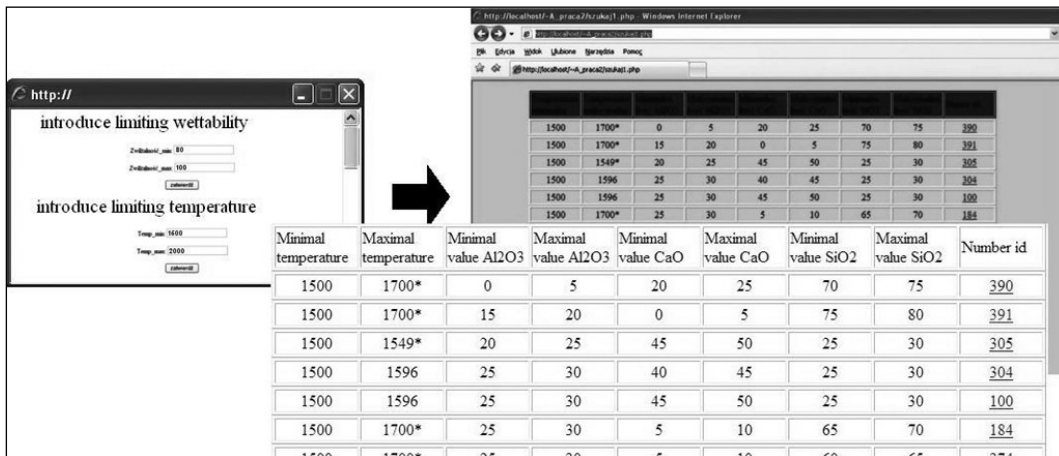


Fig. 2. Presentation of results of filtration of database the regard the limits the value the chosen proprieties the physics chemical

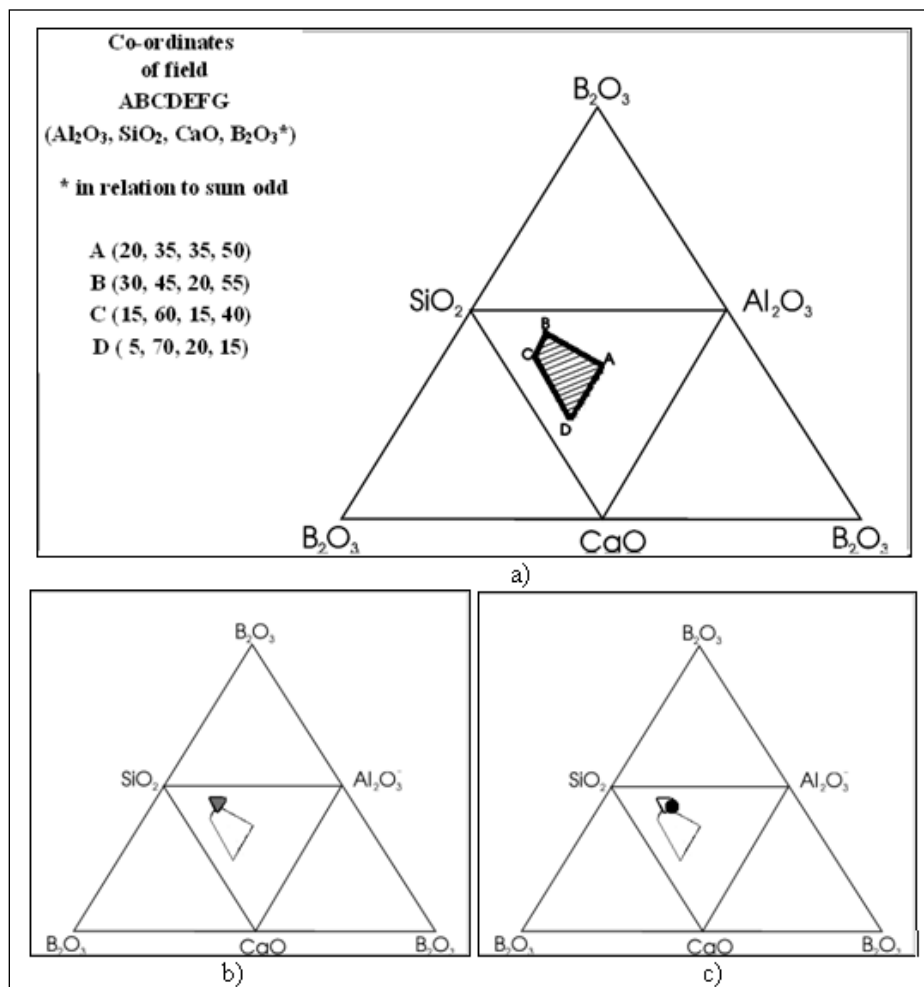


Fig. 3. Ranges of optimum concentrations with analysis the graphs of system Al<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-CaO- B<sub>2</sub>O<sub>3</sub> in basing about measurements: a) of stickiness and melting-point, b) with proposed programme, c) after the DTA investigation

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## 4. Summary

Worked out programme need finishing up yet. Necessary DTA is introduction of peck of data and their verification method. The database, in system SQL, it will be accessible in aim fuel make-ups by different users. It it was it been possible was already now however to move following:

- there are possible and purposeful the construction optimization programme engaging all of the phisics chemical influence the slags in processes of melting metals alloys,
- the proposed results, ranges of areas on graphs of phase equilibria's, demonstrative on the optimum values, will be verified in laboratory conditions and industrial,
- the initiation of the new data the gathered base will be built in system of open base enabling.

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