IMPROVED TECHNOLOGY OF METAL DEGASSING BY GAS MIXTURES AT LADLE TREATMENT

The change of stirring gas composition was made at ladle treatment of steel of commercial structural grade. The technique was developed on the base of physic-chemical analysis of dissolved gases behavior in a liquid metal and in the process of solidification of continuous casts.

The complex mathematical model for the analysis of liquid metal degassing (consists of four blocks are linked between and works independent) was created.

Advantages: The estimation of degassing indexes of metal can be made at atmospheric pressure, at vacuum treatment, at metal blowing by gases both through the bottom of ladle and through deepen lance, and at continuous casting solidification.

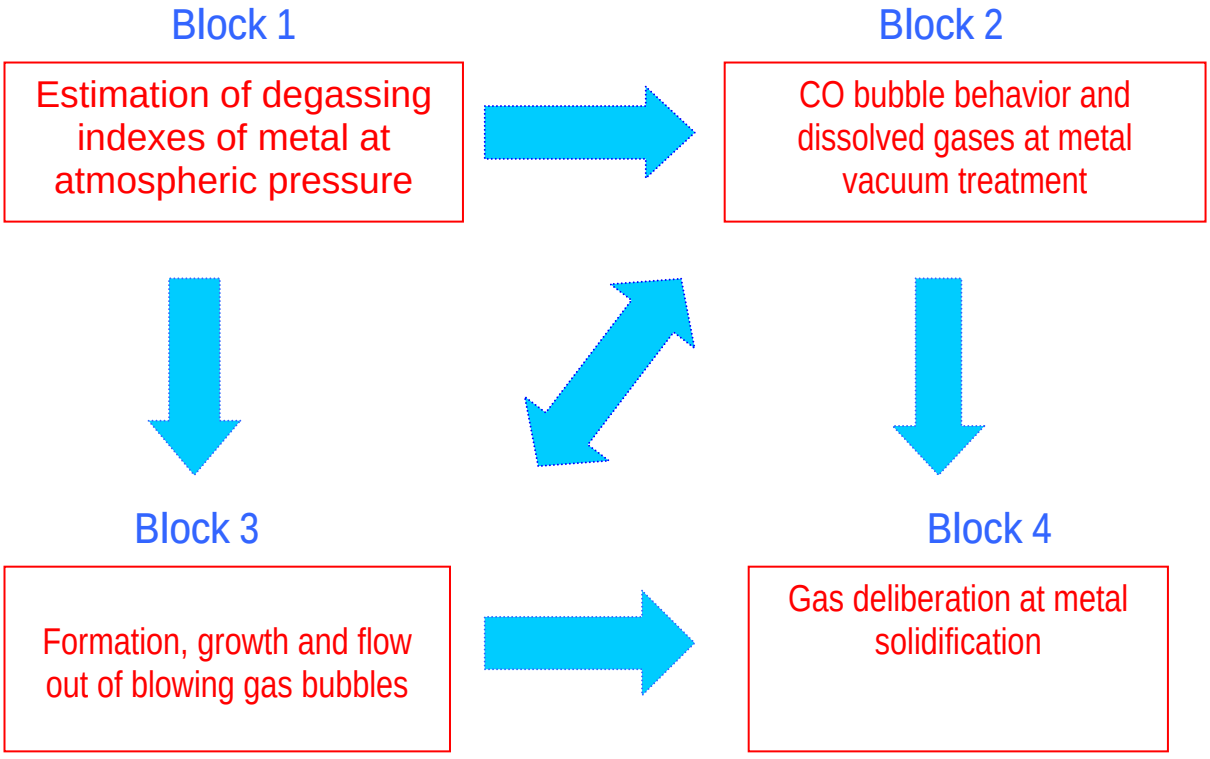
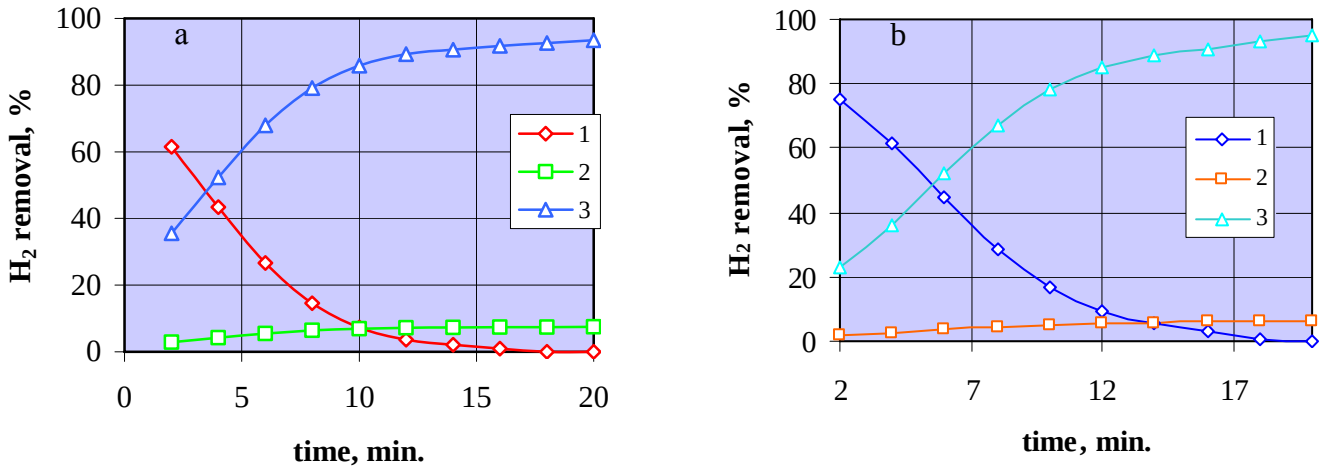


Chart of complex mathematical model.

The analysis of metal degassing processes at melt blowing by an argon on ladle furnace is represented as the share of gas removal in bubbles CO, argon and through an metal surface.

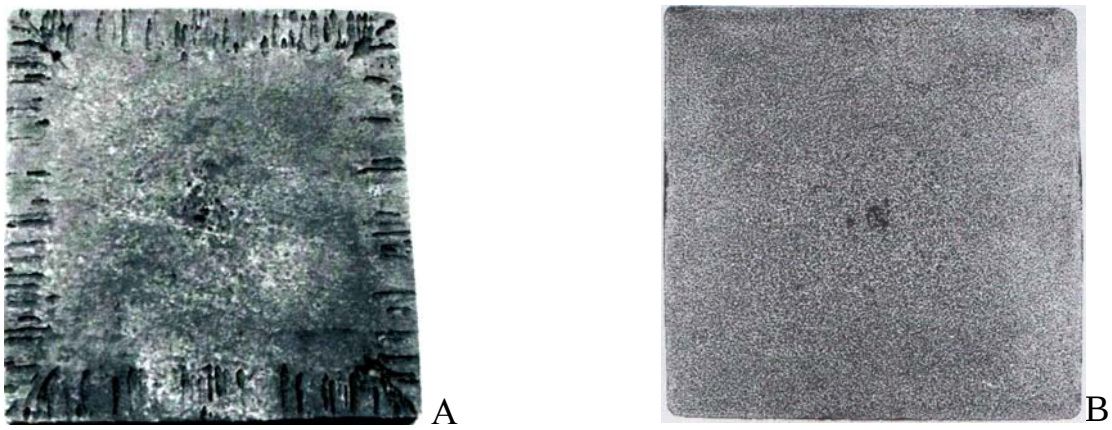


The share of gas removal at steel blowing by argon (а, б) and by argon-nitrogen mixture (в): 1- in CO bubble, 2 – in the argon bubble, 3 – through 50% of the open surface of metal

The consumption of inert gas at blowing usually makes 0,3-2,0 m^3/t. The argon replace by nitrogen will allow substantially cutting the prime costs of gas stirring of metal in the ladle.

The dissolution of nitrogen at its blowing in a metal could results to deliberation of nitrogen at casts' solidification that will bring to non-uniformity of continuous cast billet.

The gas mixture usage did not change of continuous casting billets' structure as well as the amount of the non-metal including and steel mechanical properties.



Macrostructure of continuous cast billet blowed by nitrogen (A)and mixtures of argon and nitrogen (B) in LHF

The blowing mixture argon-nitrogen at vacuum treatment don't change the kinetic and mechanism of oxygen and hydrogen removal from steel. The nitrogen coming in metal from blowing mixture is removed into CO bubbles and through surface.