

ABOUT A ROLE OF GAS CONTENT IN CAST IRONS

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Results of the works showing are given, that the fissile role in shaping properties of pig-iron belongs to " gas impurities » and, first of all, hydrogen, nitrogen and oxygen. The inference is made, that in linkages with intensive searching ways of shrinking of an alloy building, reception of pig-iron starts to experience new life, and application of the substances hydrogen-containing, nitrogen and oxygen, will give in revising regulations about of substance of the mechanism of formation of basic constituents of pig-iron - graphite and cement carbide. By metallurgists of different directions on reception and machining of metals and alloys with 20-30th years of XX century it was paid attention to presence at alloys of gases and their influence on properties. For today influence of hydrogen, nitrogen and oxygen steadfastly study everything, beginning from ore, mix material, smelting, a crystallization, pressure treatment, thermal and galvanic treatments, a welding and finishing those who carefully reveals the reasons of shattering of finished products. The greatest welders as in their line of business the role of hydrogen from the very beginning has been legibly spotted have achieved successes. It consists in a volume, that hydrogen is an element which blights quality of welded joints. In this connection metallurgists - welders have developed the master schedules providing disposal of hydrogen from metal. At recognizing a role of hydrogen, nitrogen and oxygen in shaping properties of metal alloys important there is a problem on sequence of their arrangement on a degree of influence. This sequence can be: H - N - O or O - N - H. As their operation on properties of metals and alloys have competing character, remains very important to spot to who from them possesses the leading part. Therefore the assaying of different features of their influence on properties of pig-iron is lead.

Operation of oxygen surveyed. Its solubility in iron is much less, than hydrogen and nitrogen. A structural diagram - oxygen and its different isobaric sections show iron, what even at 800°C there is a division of a hematite into a magnetic iron ore and gas, and hereinafter a magnetic iron ore decomposes on vyustit and gas. In many works dif-

ferent problems on influence of oxygen on properties of pig-iron and comprehensibility of other elements irradiated. Each time in them new features of its influence which till now do not allow to reveal any uniform legitimacies are erected.

The much more number of works is devoted to nitrogen. Operation of it is analogous to operation of carbon. Results, reduced in monographies M.L. Korolev « Nitrogen as an alloying element in steel », A.N.Morozov « Hydrogen and nitrogen in steel », L.I.Levi « Nitrogen in pig-iron for casts », V.I.Lakomskij and V.I.Javojksij « Gaz in cast irons », V.V.Averin, A.V.Revyakin, V.I.Fedorchenko, L.N.Kozin « Nitrogen in metals » and many other large survey works, have convincingly proved a feasibility of nitrogen in the capacity of an alloying element. It is possible to bleed the special operation of nitrogen consisting in fine crushing of graphite precipitations, stabilizations and magnification of volume ratio of cement carbide. It renders the strong influence on all technological and service properties of pig-iron.

By quantity of the works devoted to hydrogen, it is possible to state with confidence, that as it for a long time has already transfered object of steadfast attention of contributors on the first place. It is necessary to mark some instances of solving influence of hydrogen on processes at an iron smelting and its subsequent machining. At first, the contents of hydrogen in a melt is greater, than in the hardened pig-iron. At second, hydrogen is oozed from solid pig-iron at a storing.

Thirdly, the greatest quantity of hydrogen is determined on graphitic pluggings (in 2-2,5 times it is more, than in a metal lower die). These results received L.I. Levi and A.N. Aleksandrovoj, were defining for the solution of a task in view.

In V.I.Shapovalova's monography « Influence of hydrogen on structure and properties of iron-carbon alloys » linkage of all features of reacting of pig-iron on external actions with presence of hydrogen that was sizing up numerous works of specialists on analysis of influence of hydrogen on properties of metals and alloys is convincingly enough shown. V.I.Shapovalov and L.M.Poltoratsky for the first time have published work on a structural diagram iron - carbon

- hydrogen. He [1] makes the inference about application of hydrogen in the capacity of an alloying element: « Thus, the experimental datas saved to the present moment show, that use of hydrogen in the capacity of an alloying element of brand new type is perspectiv. Uniqueness of hydrogen as alloying element consists not only of an opportunity of nontrivial action on properties of metals and a history in them phase and structural transfomations, but also in an opportunity of a so-called reversible alloy building which is impracticable with the help of any of other chemical elements ».

Special and strong influence of hydrogen on properties of pig-iron requires more careful assay-

ing of the reasons of formation of graphite that will allow to attach ancient pig-iron the second breathing [2].

References

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2. Afanasjev V.K., Ajzatulov R.S., Kustov B.A., Chibriakov M.V. Progressive expedients of pinch of properties of domain pig-iron. - Kemerovo: Kuzbass institute of higher education publishing house, 1999. - 258 p.