FEATURES OF CHANGE OF HYDROGEN, NITROGEN AND OXYGEN IN GRAY IRON

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By metallurgists with 20-30-th years of XX century it was paid attention to presence at iron-carbon alloys of gases and their influence on properties was studied. The modern contributors pay this problem major attention, they fix essential influence of hydrogen, nitrogen and oxygen on mechanical, physical and chemical properties of pig-iron.

In the given work definition of the contents of hydrogen, nitrogen and oxygen was conducted with the help of the vacuum plant of hot extraction « Evolograf VH-9 ».

Samples from gray iron СЧ20 exposed to a heating in the interval 100-1000°C within 10 h and were chilled on air. Results of definition of hydrogen, nitrogen and oxygen are listed in table. First of all, it is necessary to mark, that already after a heating at 100°C in pig-iron nitrogen is not determined at all. The contents of hydrogen continuously drops, and the quantity of oxygen is incremented up to rather major values. In other words, the heating of gray iron gives in disappearance of nitrogen and hydrogen and to occurrence of major quantity of oxygen.

Table - Influence of a heating (τ=10 ч) on the contents of hydrogen, nitrogen and oxygen in gray iron

Heating temperature, °C	H_2		N_2		O_2	
	ppm	%	ppm	%	ppm	%
Without a heating	20	0,0020	11	0,0011	50	0,0050
100	12,1	0,00121	85	0,0085	74	0,0074
200	14,1	0,00141	traces	traces	204	0,0240
300	9,1	0,00091	traces	traces	346	0,0346
400	9,0	0,00090	traces	traces	482	0,0482
500	9,8	0,00098	no	no	1500	0,1500
600	10,8	0,00108	no	no	2290	0,2290
700	6,5	0,00065	no	no	6000	0,6000
800	4,3	0,00043	no	no	10000	1,0000
900	4,0	0,0004	traces	traces	9700	0,9700
1000	7,0	0,0007	traces	traces	11350	1,1350

Change of gas content in pig-iron is investigated, graphite precipitations in which are deleted with the help of a designed expedient of machining of a melt. Samples from this pig-iron exposed to a heating in the interval 150-1100°C within 5 h with the subsequent refrigeration in water. In this case the quantity of oxygen after slight magnification up to 580°C essentially decreases after a heating at 710 and 910°C and again is sharply incremented after a heating at 1100°C. The contents of hydrogen has approximately the same character of change, that is decreases after a heating at 710 and 910°C and is incremented after a heating at 1100°C. The contents of nitrogen and in this case continuously{smoothly} decreases after a heating at 150, 200, 250°C. After a heating at higher temperatures 300, 430, 580 and 710°C it is not determined at all. Not enough nitrogen is determined after a heating at 910°C, and after a heating at 1100°C - the contents of nitrogen in pig-iron the greatest. The abnormal changes of the contents of hydrogen, nitrogen and oxygen at temperatures 710 and 910°C specify an opportunity of their participation in formation phase component which do not decompose at heating temperatures is model at the assaying.

The received results for pig-iron with graphite precipitations and without them specify an opportunity of making of the hydrogenous mechanism of spreading of iron alloys. At the successful solution of this problem mining of provisions on translation of domain pig-iron in the discharge of precision alloys can follow.