Table 1: Nominal chemical compositions of the cast iron

|  |  |  |
| --- | --- | --- |
| Type of cast iron | Alloy elements (wt. %) | |
| Aluminum | Silicon |
| Non-alloy (base) | 0 | 1 |
| Aluminum-bearing | 4 | 1 |
| Aluminum-silicon-bearing | 4 | 2 |
| Aluminum-silicon-bearing | 4 | 3 |
| Aluminum-silicon-bearing | 4 | 4 |

Table 2: Chemical composition (wt. %) of raw cast iron slabs and ferrosilicon used in the study

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Elements | carbon | silicon | manganese | aluminum | phosphorous | sulfur | iron |
| Raw cast iron slab | 3.73 | 1.46 | 0.72 | - | Max. 0.12 | Max. 0.04 | remainder |
| Ferrosilicon | Max. 0.05 | 75.71 | - | 0.48 | Max. 0.02 | Max. 0.004 | remainder |

Table 3: Chemical composition (wt. %) of the prepared cast iron samples

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Cast iron sample no. | Elements (wt. %) | | | | | | | | |
| Equivalent carbon | Fe | Al | Cu | S | P | Mg | Si | C |
| 1 | 4.48 | 94.39 | 0.007 | 0.02 | 0.058 | 0.031 | 0.27 | 1.03 | 4.13 |
| 2 | 4.44 | 90.17 | 4.210 | 0.02 | 0.058 | 0.031 | 0.27 | 0.98 | 4.11 |
| 3 | 4.35 | 89.57 | 4.120 | 0.09 | 0.013 | 0.017 | 0.38 | 2.01 | 3.68 |
| 4 | 4.31 | 89.03 | 4.190 | 0.085 | 0.021 | 0.030 | 0.031 | 3.07 | 3.29 |
| 5 | 4.32 | 88.28 | 4.230 | 0.095 | 0.014 | 0.027 | 0.22 | 3.91 | 3.02 |