



X-ray diffraction analysis of sintered products from electro- erosion materials, obtained from Cr17 alloy waste

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Introduction

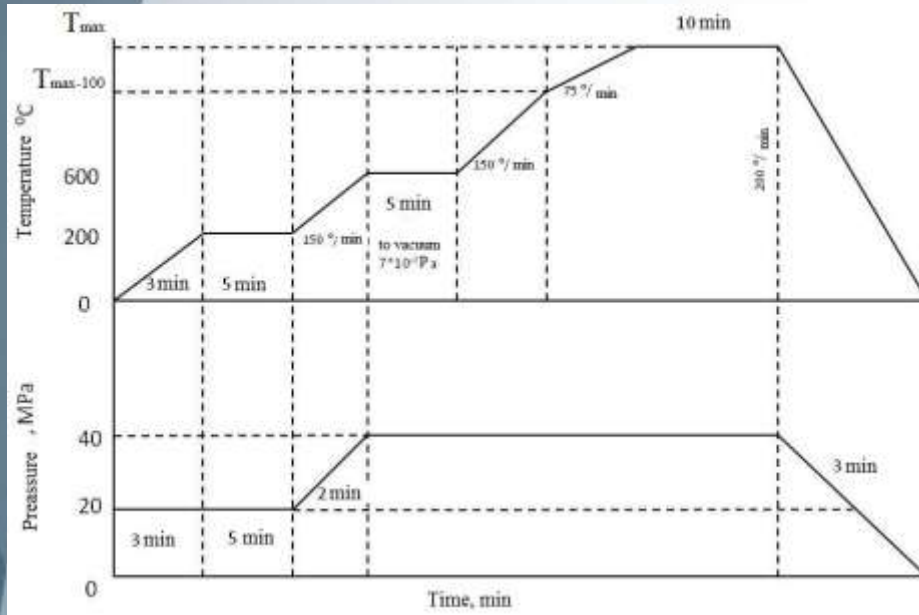
Nickel-free Cr17 stainless steel is a more cost-effective substitute for expensive nickel-containing corrosion-resistant and heat-resistant steels. Cr17 steel is ductile, durable and well welded, often used in annealed condition. The valves of hydraulic presses, conveyors for furnaces and drying lines, pipes, boilers are made from it. The widespread use of Cr17 steel in various industries leads to a large accumulation of its waste requiring processing. Currently, there are many ways to recycle metal waste in order to reuse it. However, the disadvantages of the known methods are increased energy consumption, multi-operational technological process.

The most promising method for processing metal waste is the method of electroerosive dispersion (EED), which is distinguished by the environmental cleanliness of the process and relatively low energy costs.

Carrying out the planned measures will allow to solve the problem of waste disposal and their further use and thereby reduce the cost of production of the final product.

The aim of the work was to carry out X-ray diffraction analysis of sintered samples from electroerosive materials of Cr17 alloy, obtained in lighting kerosene.

Materials and Methods

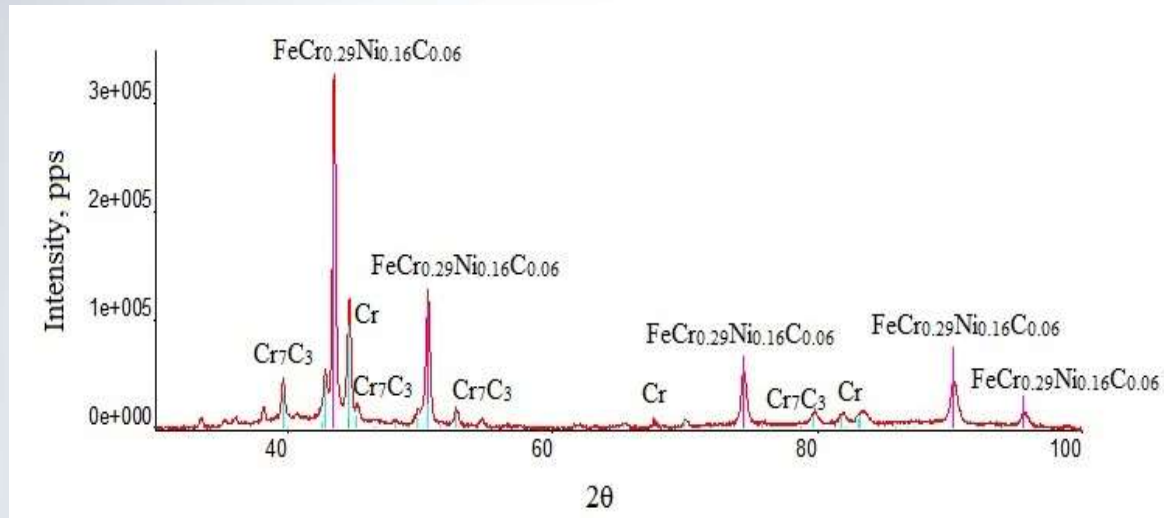


Consolidation of powders by spark plasma sintering (scheme)



X-ray diffractometer Rigaku Ultima IV

Results



X-ray diffraction pattern of the test sample

Chemical formula	Type of crystal lattice	Lattice parameters
FeCr _{0.29} Ni _{0.16} C _{0.06}	225:Fm-3m cubic crystal lattice	a = 3,605153 Å b = 3,605153 Å c = 3,605153 Å
Cr	229:Im-3m cubic crystal lattice	a = 2,871221 Å b = 2,871221 Å c = 2,871221 Å
Cr ₇ C ₃	51:Pmcm orthorhombic crystal lattice	a = 6,940538 Å, b = 12,029685 Å, c = 4,506928 Å

Conclusion

Based on the performed x-ray microanalysis, it was found that the main phases in the sintered sample of electro-erosion materials of the Cr17 alloy obtained in illuminating kerosene are $\text{FeCr}_{0,29}\text{Ni}_{0,16}\text{C}_{0,06}$, Cr, Cr_7C_3 . The study will determine the most relevant application area of the obtained samples and improve the quality of scientific and technological developments.

Acknowledgments

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