

## ABSTRACT

The work consists of: 78 pages, 14 figures, 18 tables, 37 references to literature sources.

The object of the research is the powder soft magnetic material based on Fe doped with 5% silicon.

The aim of this work is to study the influence of technological regimes on the structure and magnetic properties of powder materials of iron-silicon system.

The influence of technological regimes on the structure, chemical and phase composition, hardness and magnetic properties of the material are studied.

It was established that the addition of silicon to iron powder leads to an increase in total porosity by 3-5% across the range of compaction pressures.

It was determined that the porosity decrease to 10-12% leads to higher magnetic characteristics: relative saturation magnetization to 100-120 G cm<sup>3</sup>/g, coercive force to 280-320 A/m. The investigation of the magnetic characteristics of the materials sintered at different temperatures showed that the materials obtained at 1300 °C (being measured at indoor temperature) have the higher values of magnetic properties: their relative saturation magnetization is 160-170 G cm<sup>3</sup>/g and coercive force is about 260-280 A/m.

**Keywords:** SOFT-MAGNETIC MATERIALS, FE-SI ALLOY, CHEMICAL AND PHASE COMPOSITION, STRUCTURE AND MAGNETIC PROPERTIES.